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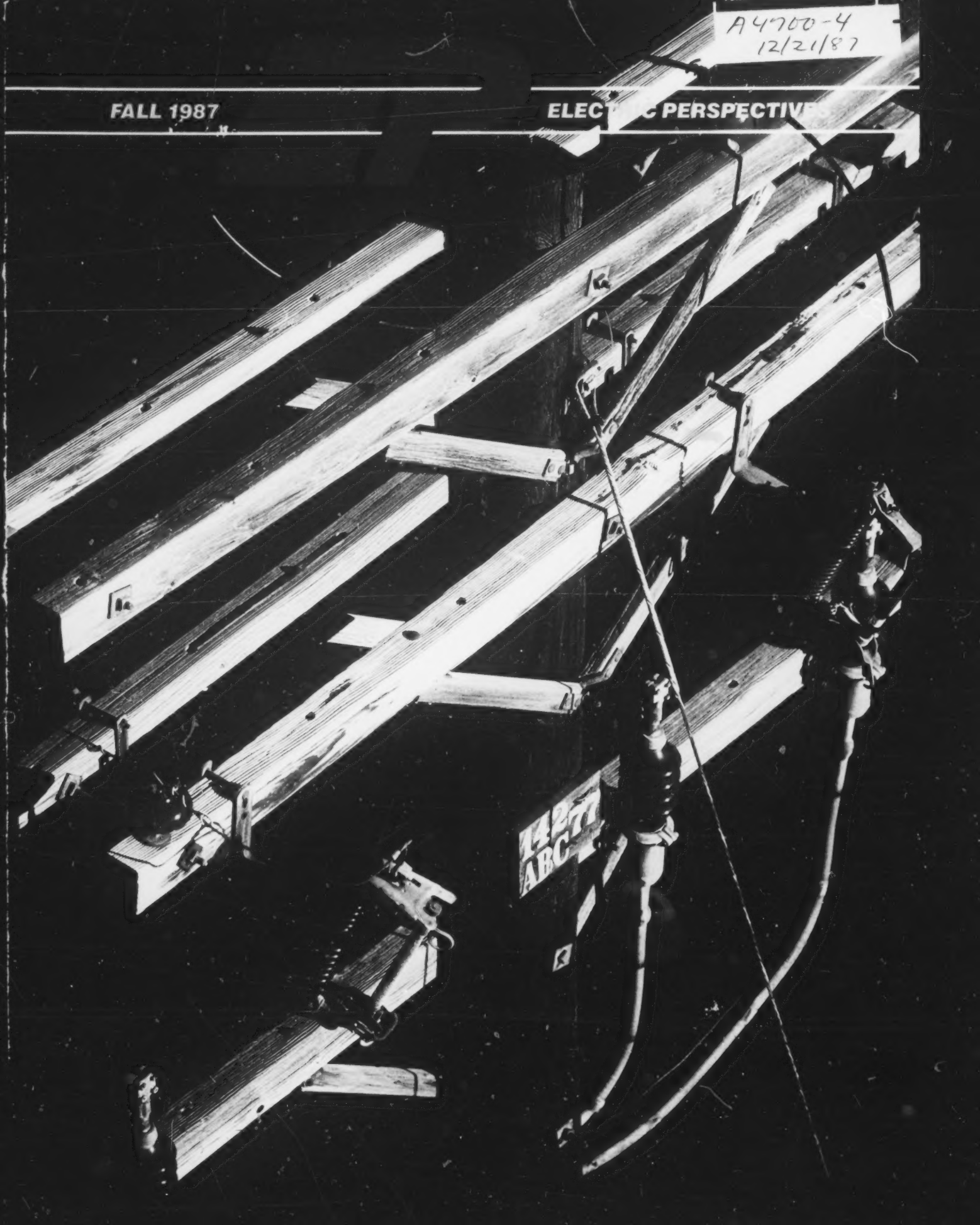

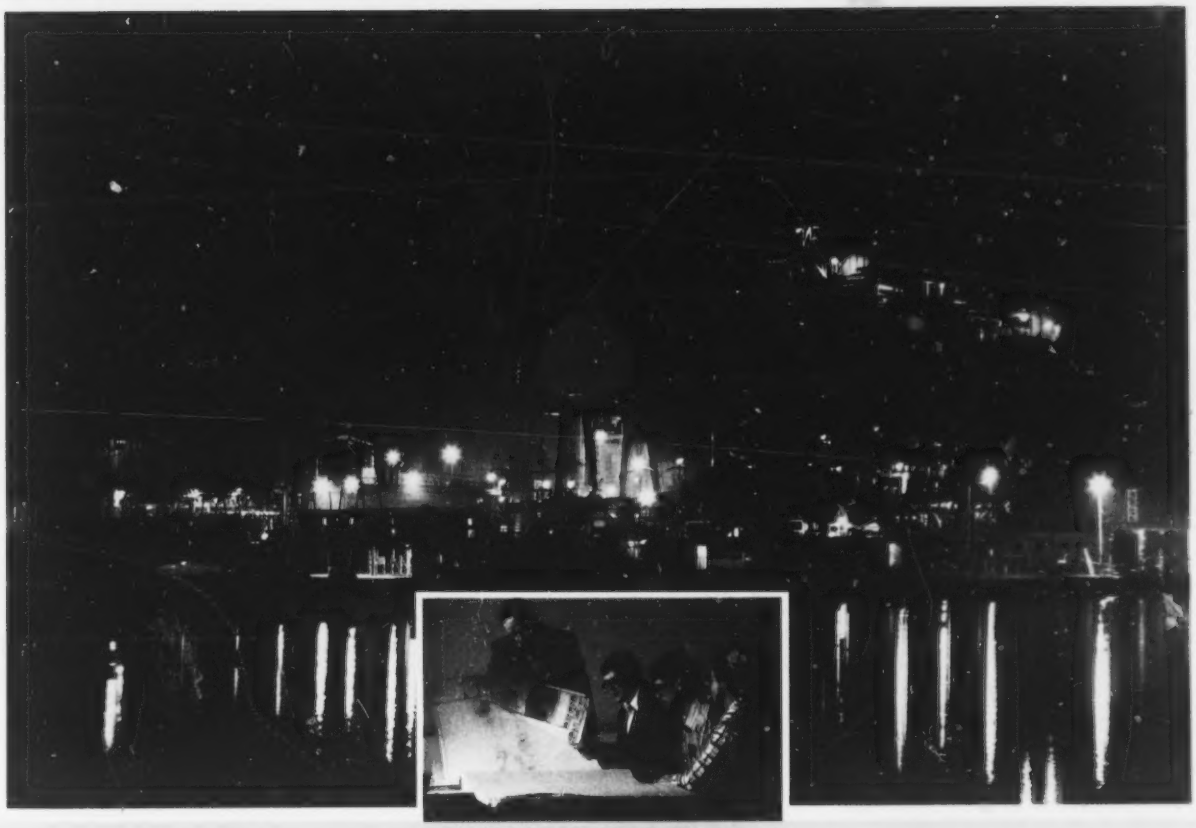

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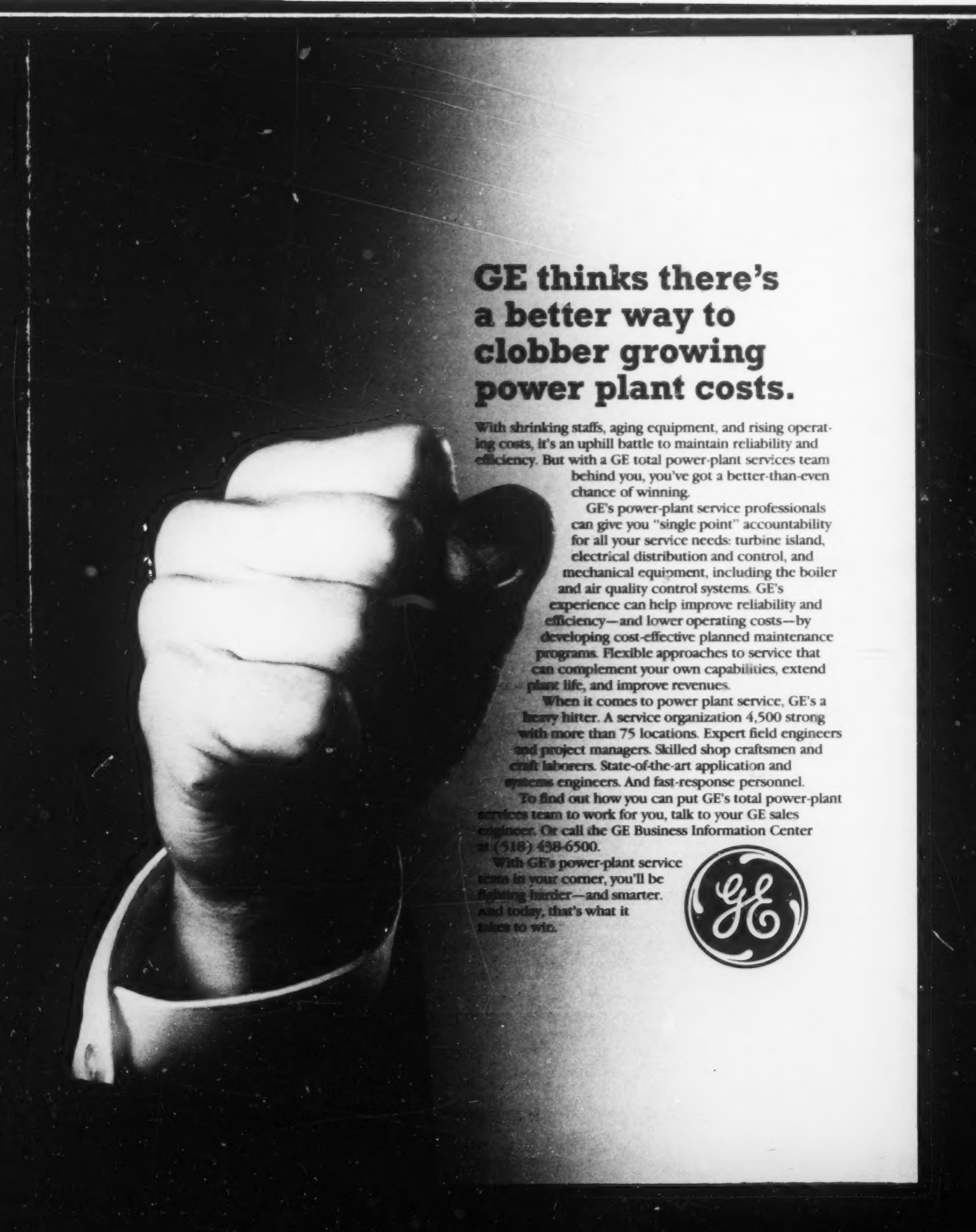

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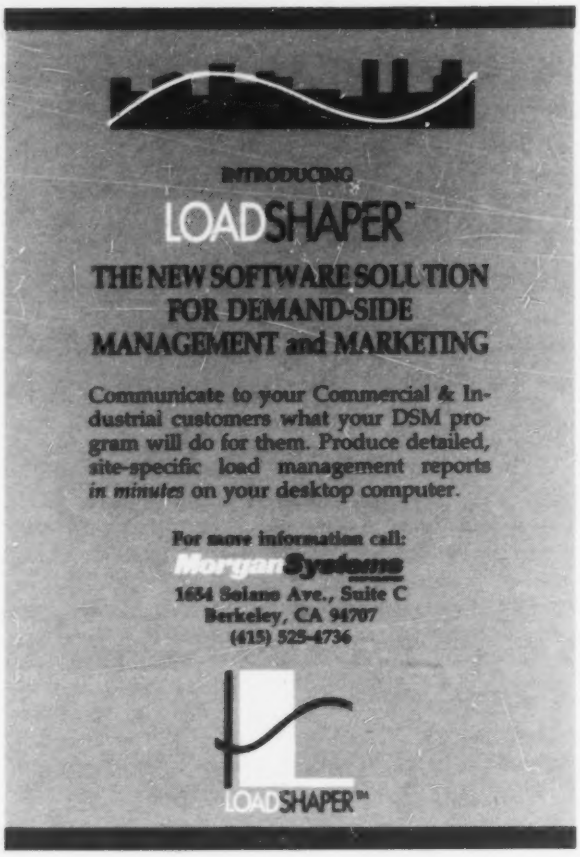

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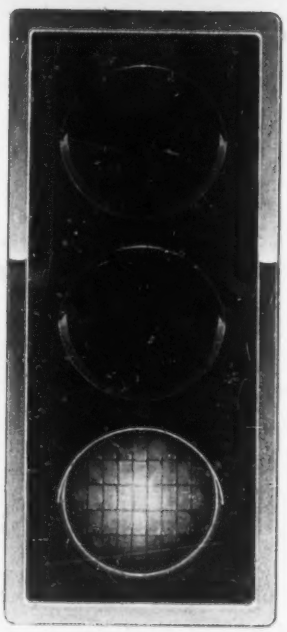

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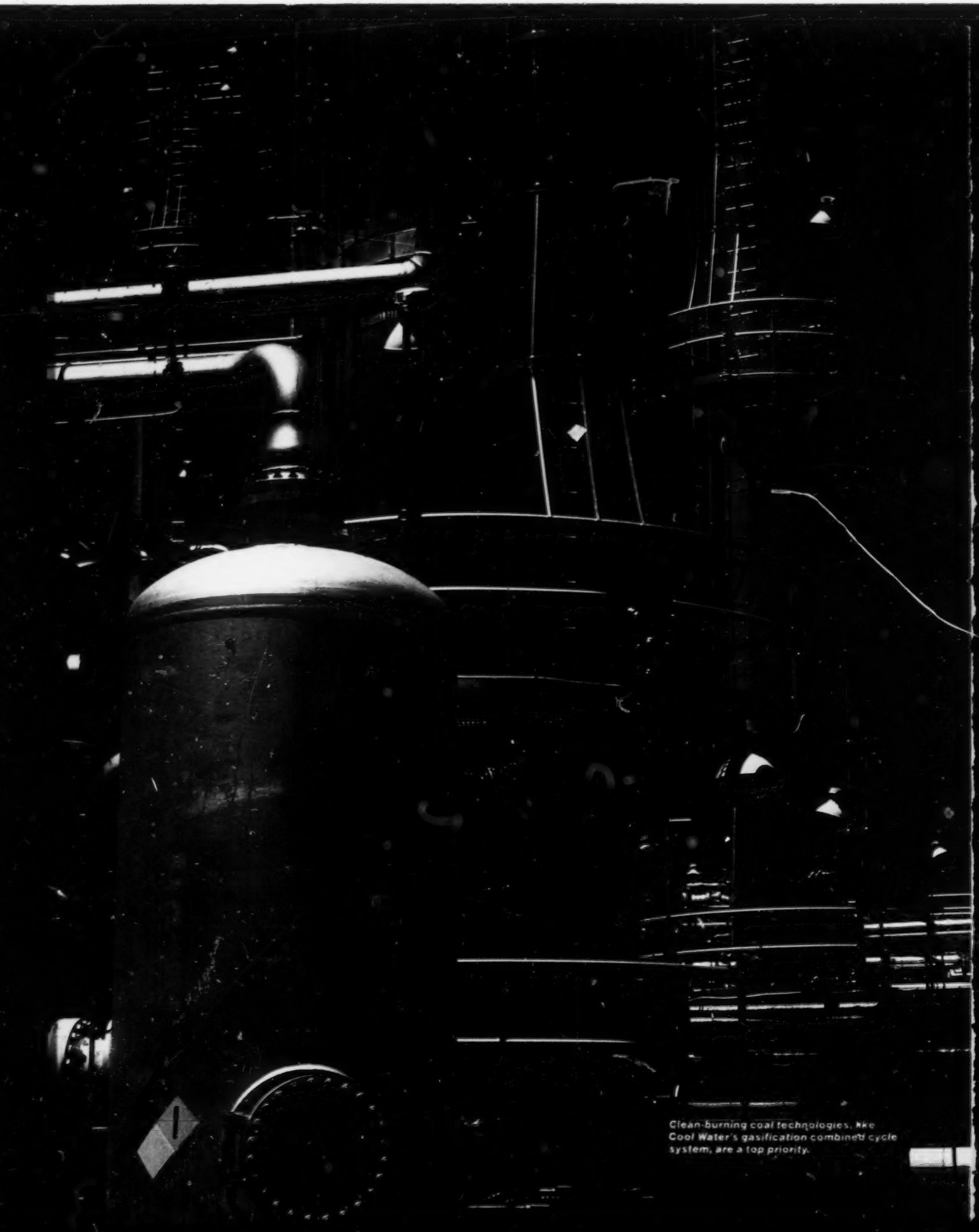


Clean-burning coal technologies, like Cool Water's gasification combined cycle system, are a top priority.

Richard J. Myers

Market-Driven R&D

Industry-sponsored programs at the Electric Power Research Institute help utilities stay competitive

Electric utilities' drive to keep their customers' costs down has never been more intense. Vigorous competition from cogenerators, independent power producers, gas utilities, and even other electric utilities faces each of them.

To meet this challenge, utilities individually and collectively are searching for ways to produce and deliver power to their customers more cheaply and for ways to help those customers get the most out of that power—all without sacrificing environmental, safety, or reliability standards.

One of the major players in this search is the Electric Power Research Institute (EPRI). A nonprofit research and development organization, EPRI has managed large-scale R&D programs for the U.S. electric utility industry since 1973. Growing out of collaborative R&D programs utilities undertook in earlier days through the Edison Electric Institute and the Electric Research Council, today EPRI is supported by voluntary contributions from more than 600 member utilities. It manages a $324 million annual budget and employs some 700 people.

As EPRI President Floyd L. Culler explains in the organization's 1986 annual report, "The industry's concerns have focused strongly in recent years on reducing costs and enhancing markets, and EPRI's overall program has shifted significantly to reflect this emphasis. Over half of our research is now dedicated to these two areas. . . ."

Demand-Side R&D

EPRI's end-use portfolio includes advanced heat pump technology, improved cooling and heat storage technology, several new electric techniques and processes for the industrial sector, and new "smart" controls and power electronics for all customer classes. "The opportunities are tremendous," enthuses Fritz Kalhammer, Vice President of EPRI's Energy Utilization and Management Division. "I could talk your ear off and never run out of examples of the things we could do. Our problem is we don't have the resources to explore all of them."

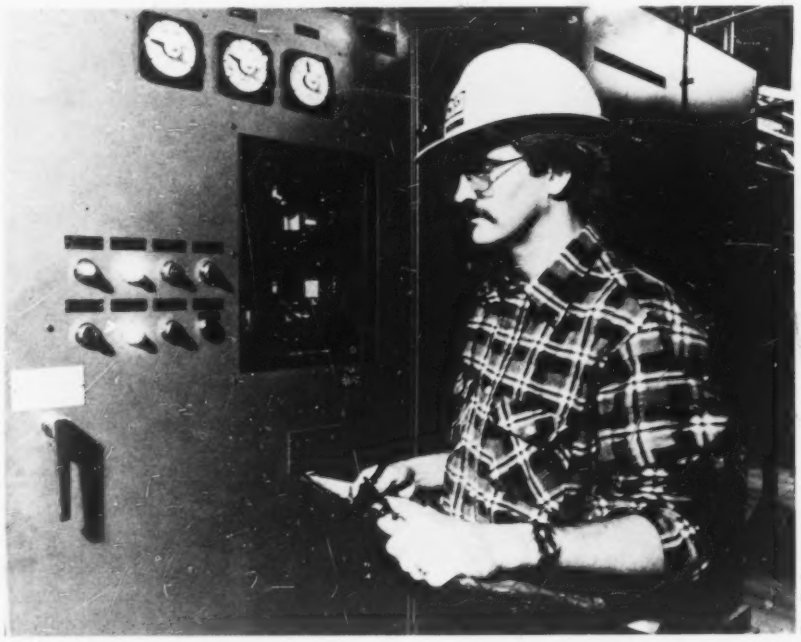
Kalhammer's mission: finding ways to enhance the competitiveness of electricity, to reverse the decline in utility load factors, to retain today's industrial load, and to carve out new markets for electricity. The electric utilities are "part of the economic infrastructure of their regions," Kalhammer says. "Declines in important industries very quickly translate into loss of load. The electric utilities are very concerned about the competitiveness of their industrial customers."

In the short-run, save for changing rate structures, Kalhammer thinks electric utilities can do little to "reduce the cost of electricity to their hard-pressed industrial customers." But coming soon are several ways to cut the cost of power to industry by increasing efficiency of use. New electronics and electric motors are a favorite example, simply because the opportunities are vast (save for primary metals production, motors account for more than 70 percent of the industrial power use). The new technology here is the adjustable speed drive, which constantly tailors a motor's appetite for kilowatts according to the mechanical load on the motor.

Adjustable speed drives (ASDs) have great potential for cutting the cost of industrial energy service. Several utilities—including Sierra Pacific Power, Gulf States Utilities, Iowa Public Service, and Oklahoma Gas & Electric—are installing ASDs on boiler feedwater pumps and big forced-draft fans. In one joint EPRI project with Sierra Pacific Power, an ASD was added to a 2,000-horsepower motor on a feedwater pump. It cost $375,000 to install and saved $1.6 million worth of electricity its first year—a five-month payback.

The development trends in ASD are encouraging. The cost of the devices is coming down—from $125 per horsepower to $60 per horsepower over the last two years. Electronic motor speed control offers other advantages, like "soft" starts, which extend motor life and reduce maintenance, and more precise control, which can improve production processes. Within 15 years, EPRI reckons ASD will control nearly half of the electricity used by industrial motors in the United States (an 800-billion-kilowatt-hour annual load). The energy savings could be as high as 150–200 billion

Richard J. Myers is Director of Editorial Services at USCEA.



Sierra Pacific

Utility operator David Sanford checks the ASD control panel at Sierra Pacific's Fort Churchill plant; the ASD paid for itself in five months.

kilowatt-hours. ASD is a case of electric utilities selling less, cutting the customer's bill, matching the delivered energy to the work required and thus retaining load that might otherwise be lost.

Kalhammer's division is also pursuing a handful of ways to increase load and boost customer productivity by using electricity in new ways. The first winner here: electric plasma torches for melting cast iron machining wastes, developed jointly by EPRI and Westinghouse Electric Corporation. (Westinghouse operates a 2-to-3-ton-per-hour pilot plant at its Waltz Mill, Pennsylvania, test center.) The plasma torch produces a superhot gas. Kalhammer describes it as a "simple, inexpensive heating device that is enormously efficient in producing the high temperatures needed for processing metals and other key materials like ceramics."

EPRI sees big potential—perhaps as high as 3,000 megawatts of new load—in adding plasma torches to the cupola furnaces used by foundries. Conventional cupolas consume large quantities of coke and require extensive pollution controls. EPRI's tests show that adding a plasma torch to the cupola furnace can cut the cost of hot metal production by 30 percent. The plasma cupola delivers heat to the process without combustion, so it can handle fine material that would otherwise have to be preprocessed. And it needs less coke. The happy result? "Cheaper raw materials, better control, less air pollution and, hopefully, a more competitive U.S. foundry industry," says Kalhammer.

In many cases, these new electrotechnologies will improve productivity and product quality as well as energy efficiency. Consider evaporation. "When you concentrate any material from an aqueous solution by evaporating the water, you're doing a lot more work than you need to. It's a tremendous waste of energy," says Kalhammer. Even so, many industrial processes today use fossil fuels to evaporate water. EPRI (working with the Dairy Research Institute) just built a small pilot plant to test freeze concentration of milk products.

To meet the onslaught of high-

Westinghouse

The Westinghouse plasma arc torch can achieve temperatures of more than 9000° F.

efficiency gas-fueled appliances in the residential and commercial sectors, EPRI is fielding an advanced electric heat pump developed jointly with Carrier Corporation. Thirty percent more efficient than today's typical heat pumps, it has adjustable speed drive motors and advanced electronics (which increase user comfort and allow the utility and the user to control the unit's power demand). This new product will supply hot water as well as space heating and cooling. About 35 of the new heat pumps are being field tested now, and Carrier expects first production of commercial units in 1988.

Kalhammer worries about the inroads by natural gas in the commercial space cooling market. Space cooling is about one-third of commercial energy use and the largest single contributor to sum-

Daemmrich/Uniphoto

Smaller, less exotic R&D projects, like eliminating ground rot in poles, continue to help utilities in a big way by reducing costs.

mer peaks. Although EPRI has been working for several years on "cool storage" systems that can be powered with off-peak electricity, Kalhammer thinks more should be done in this area, particularly since other private sector efforts are small and fragmented. He also sees opportunities in developing commercial cooking equipment (now dominated by gas) and cost-effective heat storage systems, which the utilities could use to shave winter peaks and to add desirable off-peak loads. The point, he says, is to move load factors up by using demand-side, customer-motivated techniques.

Supply: It Hasn't Gone Away

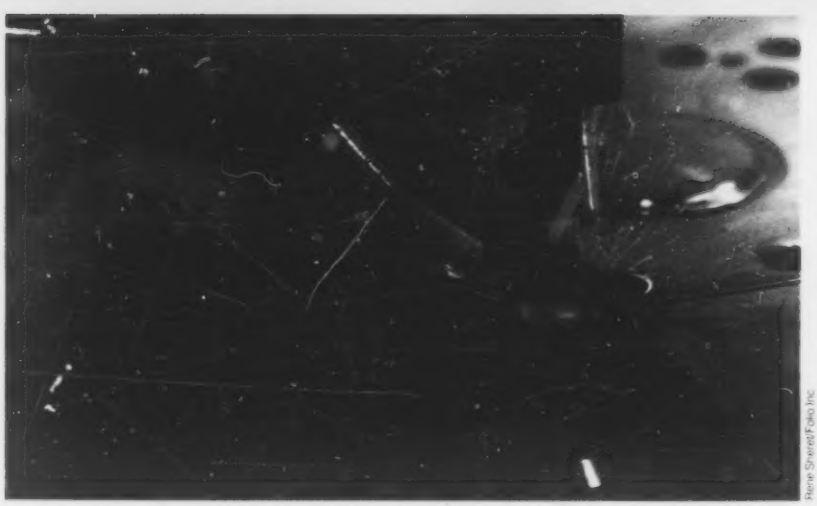
Although end-use R&D is the new darling, the supply-side issues have not disappeared. The logic that drove EPRI's supply agenda through the 1970s remains pretty much intact. The industry called for modular, more efficient production technologies that could be built quickly and deployed in smaller sizes, in hundred-megawatt chunks, as needed. The utilities wanted technology that was cleaner environmentally, in which pollution control was simplified, and that could accommodate tighter environmental requirements in the future. Although today some utilities may want less emphasis on the supply side, the industry is not unanimous on this. Clean-burning coal technologies, for example, remain a top priority at the Southern Company's R&D subsidiary, Southern Company Services. "We have a major commitment to coal, and there are new technologies out there that can make existing plants lower emitters and cut costs substantially," says William Harrison, Southern Company's top research man.

Two supply technologies dominate EPRI's supply effort: coal gasifiers feeding combined cycle power plants and fluidized bed boilers (EPRI is betting about $100 million on several projects in this latter area).

In gasifiers, the jewel in the crown is Cool Water, a $270-million, 117-megawatt coal gasification/power generation complex in the California desert. EPRI provided $69 million of the equity for the project; Southern California Edison provided the site, its Cool Water plant near Daggett, California. This prototype plant is the utility industry's ace-in-the-hole on the supply side. If all goes as expected, it will validate the utilities' leading supply strategy for the late 1980s and early 1990s: installing combined-cycle combustion turbine plants fueled with gas, then adding a gasifier and shifting to coal if and when gas prices start to rise. (The crossover point is about $4.50 per

Jon Riley/Folio Inc.

On the demand side, electric utilities are supporting the introduction of electrotechnologies that will help their industrial customers stay competitive and improve utility load factors.



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million Btu, EPRI estimates.) Until a technical problem brought the main Cool Water gasification train down late last year, it had run for seven consecutive months at better than 65 percent capacity factor. The plant is now producing about 90 megawatts using a spare quench gasifier.

Next year will see start-up of a 160-megawatt demonstration of atmospheric fluidized bed combustion at the Tennessee Valley Authority's Shawnee plant. EPRI is in for $75 million of the $200–$210 million cost of this project.

The high visibility of these big supply-side projects obscures many other smaller supply projects that are as urgent as anything on the end-use side. Often these are the ones that pay back quickest. "Our bread and butter are the mundane things that add up to big bucks: our water chemistry work in nuclear, non-destructive inspection and testing, eliminating ground rot in poles, understanding and eliminating the cause of forced outage rates, and improving heat rates," says EPRI's Executive Vice President Richard Balzhiser.

Today, EPRI's supply-side people are particularly sensitive to deteriorating load factors. The structural changes in the electricity business "are driving us toward putting more emphasis on energy storage—*to* levelize load and protect existing baseload units," says Dwain Spencer, Vice President of

John Zoiner/Unisphoto

The need to improve load factors to avoid cycling baseload plants is driving supply-side R&D as well.

EPRI's Advanced Power Systems Division. "Load factors are continually eroding," from about 59 percent in 1978 to 52 percent today, Spencer says. "We're really dangerously close to the point" when utilities will be forced to cycle baseload nuclear and coal-fired capacity that was never designed for cycling duty. Thus, the importance of improving load factors is driving supply-side research as well as demand-side research.

Part of the answer may be energy storage, so utilities can charge storage systems with off-peak power and thereby build off-peak demand. EPRI has two approaches: batteries and compressed air.

A frenzy of battery research in the late 1970s and early 1980s—using exotic electrolyte combinations like sodium and sulfur—led back to the good old lead-acid battery. "I honestly don't see a lot of alternatives to lead-acid batteries," Spencer says. "The so-called 'advanced' batteries just didn't play out as expected, although we continue to support a modest research effort." EPRI has a joint project with Southern California Edison to build a 10-to-50 megawatt-hour lead-acid battery storage plant that should be up and running in 1988. It should come in at about $1,500 per kilowatt installed; when fully commercial, the cost of battery storage could drop to about $1,100 per kilowatt.

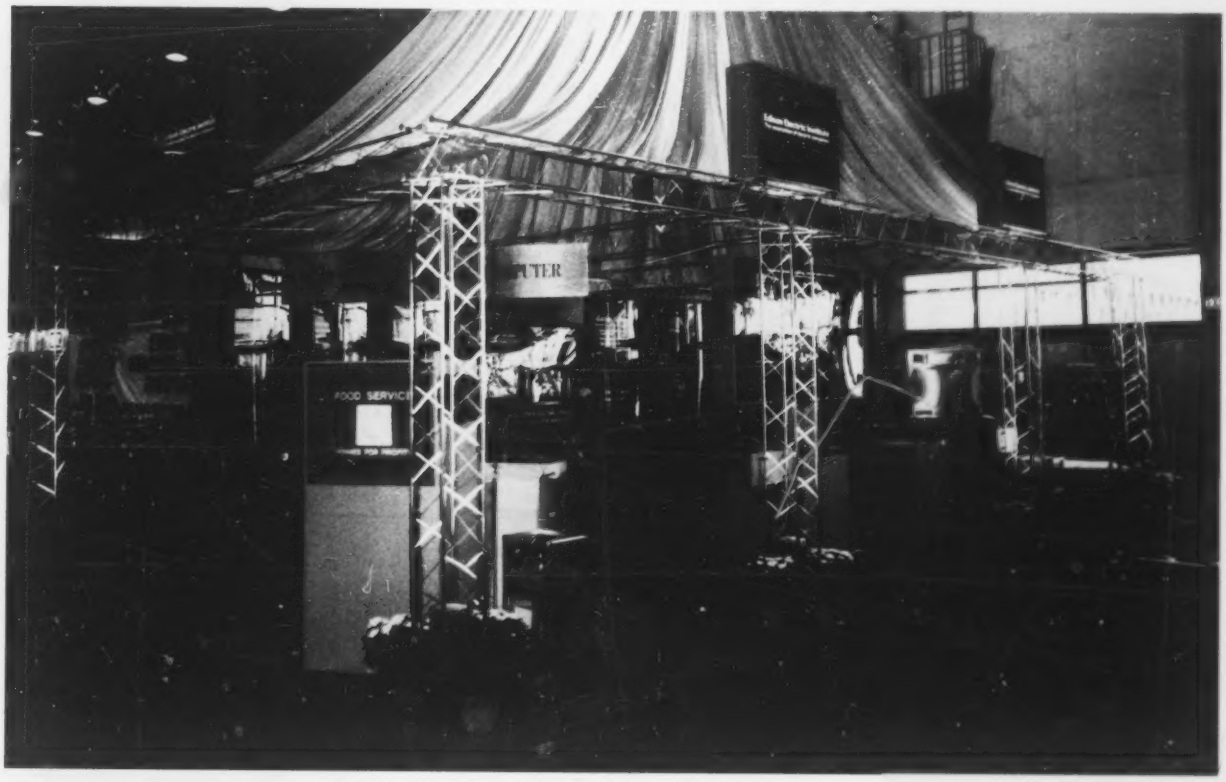
Compressed air storage should be even cheaper—perhaps $700–$800 per kilowatt. EPRI and Alabama Electric Cooperative are collaborating on a 600-megawatt-hour compressed air plant—mining out a salt dome, filling it with compressed air, then drawing it down and combusting it through two low-temperature, high-pressure turbines.

EPRI also sees short-term potential in balance of plant systems. The new gasifiers and fluid bed boilers are "the sexy side of the power plant, but much remains to be done in the rest of the plant as well," says Kurt Yeager, Vice President of EPRI's Coal Combustion Systems Division. "Turbines, materials, the steam side . . . that technology has stagnated over the last 30 years. As a result, heat rates and efficiency have also stagnated and even regressed. To overcome this, we are starting a new wave of development to improve all aspects of power plant technology. This work will draw on the worldwide capabilities that have evolved over the past several years."

European and Japanese utilities, for example, regularly build high-tech, high-efficiency, supercritical coal-fired power plants, operating at 4500-psi steam conditions. American utilities still routinely build subcritical units (operating at 2400 psi). "People think there's a conflict between efficiency and reliability," says Yeager. "It's not so." Yeager thinks this new power plant technology fits well with the industry's interest in extending the life of its existing power plants. The new components and materials can be introduced "incrementally" as companies refurbish their older power stations. This will improve availability and efficiency while accumulating the experience necessary for large-scale new plant applications.

The Losers

EPRI solves its demand-side vs. supply-side dilemma by slicing away at longer term R&D. Near-term R&D (commercially available results within 10 years) accounts for about 61 percent of EPRI's program funding; intermediate R&D



Renewed marketing programs to retain, build, or shape load complement the market-driven R&D underway. For example, thousands of potential customers visited Edison Electric Institute's commercial cooking exhibit this fall at the National Association of Food Equipment Manufacturers' show in Las Vegas or the Midwest Food Service and Lodging Exposition in Chicago.

(commercial availability anticipated in 10–25 years), 34 percent; and long-term R&D (commercially available results anticipated in 25 or more years), 5 percent.

Fusion, breeder reactors, MHD, and other longer term supply work has basically been eliminated from the EPRI program. For example, out of a nuclear R&D budget of $60 million a year, EPRI spends only about $4 million on advanced reactors, most of it on advanced water reactor designs. The focus is on the short-term nuclear needs: better availability, longer fuel life, better maintenance techniques, robotics, and safety issues.

Nevertheless, EPRI intends to reverse this trend; it has its sights set on moving the long-term portion of its budget up to ten percent. A recently created Explatory Research program, with heavy emphasis on materials work, including superconducting ceramics, is evidence of their new direction and commitment.

How Much is Enough?

Exact numbers are hard to come by, but the U.S. electric utilities spend, at best, roughly 0.5 percent of revenues on R&D. This is very low compared to other high-tech, competitive industries. According to a review of 1985 corporate R&D spending by the *Wall Street Journal*, IBM spent 6.9 percent of revenues on R&D; ITT spent 9.1 percent; Digital Equipment, 10.7 percent; Sperry, 8.8 percent. In 1984, the aerospace industry spent just over 4.5 percent of sales on R&D; the telecommunications sector spent close to 4 percent. The average for all U.S. industry was almost 3 percent.

The U.S. utilities are also outspent by utilities overseas. The state-owned utilities in England and France spend 3–5 percent of sales on R&D, says EPRI's Balzhiser, and the Japanese power companies are in the same league.

R&D spending by American power companies is "definitely below what ought to be spent," says Balzhiser. "But I don't think we have to spend at the IBM level, or at the level of foreign utilities, to do a respectable job. A collaborative effort through EPRI funds a far larger and more robust R&D program than individual companies, foreign or domestic, could undertake. We don't need 4 or 5 percent of sales for R&D. If those utilities not currently participating in EPRI contributed at the average rate of our members—about 0.33 percent of revenues—we could add over $100 million to our current work and be responsive to most of the industry's current and future needs."

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Competition in Electric Power Generation

A Regulator's Perspective

Increasing competition, new technologies, and new economic realities have created a business climate for the electric utility industry radically different than those it has faced at any time in the last 50 years. Today's utilities face growing uncertainty and risk, and many are reluctant to invest in new generation.

Regulators in particular must take a hard look at the problems that have arisen over the last decade, their role in exacerbating those problems, and the need to provide more flexible regulation that can accommodate and facilitate an efficient, reliable industry.

Problems in the Industry

Symptoms of problems in the industry have been building for the past 15 years. A variety of problems, previously unheard of, are now all too familiar to utilities, consumers, and regulators:

- Between 1970 and 1985, average residential prices more than tripled in nominal terms and increased by 27 percent after adjusting for general inflation. Prices continued to rise despite excess capacity in many regions of the country.
- Unexpected declines in load growth and skyrocketing costs caused utilities to cancel 97 nuclear generating units and 75 coal-fired plants between 1974 and 1984. The sunk costs for cancelled nuclear plants have been estimated at $10 billion.
- Prudence reviews of utilities' decisions to construct generating plants continue to proliferate. State utility commissions have undertaken over 50 prudence reviews since 1975. Between 1980 and 1985, more than $6.5 billion in nuclear plant investment was excluded from utility rate bases.
- In the face of "rate shock" resulting from unprecedented costs, customer demand has dropped even further, increasing the gap between demand and capacity.
- Industrial customers have begun to bypass utilities by constructing their own generation, thus exacerbating the effects of cost increases on the rates charged to residential and commercial retail customers.
- Utility construction activity is at its lowest level in more than 20 years. To avoid the risks of capacity ownership, some utilities are deferring construction decisions beyond the lead times needed to build fuel-efficient generating plants. Continuation of this "capital minimization" strategy could cause significant deterioration of the reliability of the nation's electric power supply.

To help mid- and senior-level executives in investor-owned electric utilities gain greater insight into the perspectives others have on their industry, **Electric Perspectives** *plans to invite representatives of various organizations that play a major role in shaping the industry to share their views with us. Chairman Hesse's article is the first in this occasional series. Your suggestions for future articles are welcome.*—Editor.

New Competitive Realities

In addition to, or in response to, the problems surrounding the utility industry, there are several major trends taking place. The first of these is competition.

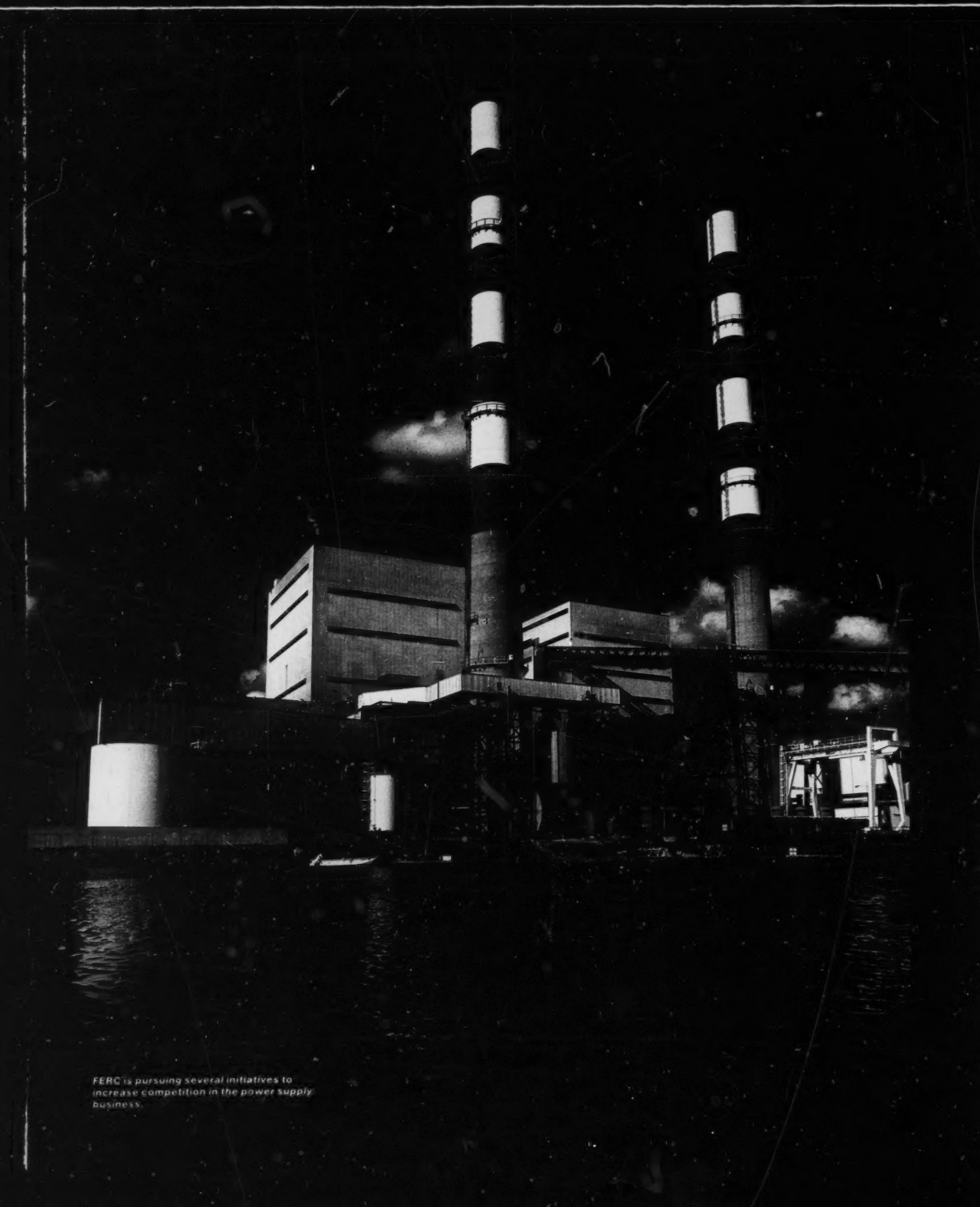
There can be no doubt that the entrepreneurial spirit is alive in the generation sector of the electric industry. Enactment of the Public Utility Regulatory Policies Act of 1978 (PURPA) spawned thousands of non-utility power producers in the form of cogenerators and small power producers. By the end of 1986, 54,000 megawatts (MWs) of capacity had filed for qualifying facility (QF) status at the Federal Energy Regulatory Commission (FERC). An Oklahoma state commission report shows that 50 to 83 percent of new capacity through 1996 will be from cogeneration.

In state after state, we continue to see that once a price is offered, potential suppliers don't hesitate to step forward. A Maine utility's recent solicitation for independent power drew 51 bids representing a total of 1,444 MWs, even though the utility plans to contract for no more than 100 MWs. A Massachusetts utility's recent solicitation for 200 MWs of capacity drew 60 bids representing a total of 2,053 MWs.

These potential suppliers reflect a broad range of project sizes and a

Martha O. Hesse is Chairman of the Federal Energy Regulatory Commission. Prior to her appointment there in October 1986, she served as Assistant Secretary for Management and Administration at the U.S. Department of Energy.

John Zoiner/Unphoto



FERC is pursuing several initiatives to increase competition in the power supply business.

wide choice of technology, fuel, and financial organization. The natural monopoly condition of continuously declining costs with increasing size is conspicuously absent.

The PURPA experience has also shown that project developers, and their financial backers, have been willing to commit billions of dollars to hundreds of projects without any regulatory assurance of cost recovery. Very large investments of capital have gone forward without rate base treatment, franchised service territories, or captive customers. A contract between buyer and seller is all that is needed. The rest of the business world operates through the medium of contracts. Apparently, the electricity supply industry can do so as well.

PURPA and other independent generators, however, are not the only competitors in the industry. Utilities are also competing with each other to make sales to other utilities, to distributors, and to large industrial customers who may have other choices. Incentive discount rates and other tools are being used increasingly as utilities are rediscovering the importance of marketing.

Although many of these competitive pressures have been the result of the PURPA statute, it is not the sole cause. Technological advancements in transmission and generation have also helped remove barriers to market entry. Improvements in transmission have made it possible to move electricity economically over longer distances, and we continue to see new developments in generating facilities, such as the phased modular construction technique and increasingly efficient turbine generators, that will minimize capital requirements for new generators. In the longer run, developments such as super-conductors may make it possible to carry electricity over even longer distances.

Martha O. Hesse

Related to these competitive pressures is the growing trend toward corporate restructuring, as some utilities seek to diversify, to spin off specific assets, or to reorganize by function (i.e., generation, transmission, and distribution).

Additionally, there is increasing pressure for greater transmission access. Although wheeling by investor-owned utilities increased by over 140 percent in the last decade, industrial and wholesale customers, as well as QFs, are calling for more.

Regulatory Response

The very premise for regulating electric utilities is that they are natural monopolies, and consumers need protection from monopolistic abuse. Responsible regulators can no longer ignore the fact that this fundamental premise has been called into serious question where electric generation is involved.

In response to the fact that generation may no longer be a monopoly in all markets, and to the information gained from the PURPA experience of the last eight years, the FERC is pursuing several regulatory initiatives involving QF as well as non-QF independent generators.

The first proposal is to give the states the option of competitive bidding as a means for determining avoided cost for generating capacity under PURPA. States would be permitted—but not required—to use competitive bidding as a means for determining avoided-cost rates for purchases from QFs. The current practice of setting avoided cost through administrative mechanisms could still be used.

States that adopt bidding could extend the competition to the wid-

1985 NON-UTILITY CAPACITY AND GENERATION

In April 1987, Edison Electric Institute published the results of a survey it conducted to establish a benchmark year for data on cogeneration and small power production in the United States. The tables below are reprinted from the full report, "1985 Capacity and Generation of Non-Utility Sources of Energy." For more information, contact the Statistics Department, Edison Electric Institute, 1111 19th Street, N.W., Washington, DC 20036.

Table 1
Non-Utility Capacity, by Type, by Division, 1985
(Megawatts)

Census Division	Cogenerators	Small Power Producers	Self Generators	Total
New England	470.4	426.6	—	897.0
Middle Atlantic	755.2	200.9	219.5	1,175.5
East North Central	1,125.1	232.0	1,566.3	2,923.3
West North Central	259.0	30.4	400.7	690.0
South Atlantic	2,628.6	654.3	347.0	3,629.9
East South Central	645.8	61.9	60.0	767.7
West South Central	5,784.1	58.0	311.0	6,153.1
Mountain	99.5	124.5	50.0	274.0
Pacific	1,449.1	1,831.0	7.5	3,287.6
Hawaii	226.2	38.0	—	264.2
Total	13,442.9	3,657.6	2,961.9	20,062.3

Note: Totals may not equal sum of components due to independent rounding.

Table 2
Non-Utility Generation, by Type, by Division, 1985
(Megawatthours)

Census Division	Cogenerators	Small Power Producers	Self Generators	Total
New England	2,204,264	2,422,189	—	4,626,453
Middle Atlantic	3,640,873	905,466	1,095,346	5,641,685
East North Central	4,479,300	939,584	7,188,343	12,607,227
West North Central	684,347	138,745	96,506	919,598
South Atlantic	13,056,623	2,727,656	1,975,818	17,760,097
East South Central	4,105,722	15,369	352,680	4,473,771
West South Central	32,706,075	221,230	1,905,253	34,832,558
Mountain	568,138	624,205	284,700	1,477,043
Pacific	7,954,900	3,500,515	43,362	11,498,778
Hawaii	1,001,658	86,204	—	1,087,862
Total	70,401,902	11,581,162	12,942,007	94,925,071

Note: Totals may not equal sum of components due to independent rounding.

The profitability of an IPP would be derived solely from its ability to deliver low-cost, reliable power and its willingness to assume investment risks. Utilities would have no legal obligation to contract with an IPP.

est possible range of participants, including non-QF power producers and the utility's own construction, in order to achieve the most accurate measure of the utility's avoided cost. However, states would not be required to allow direct participation by non-QFs as long as they somehow took all alternative power sources into account.

The bidding mechanism could be structured so that it is triggered by the utilities' identification of the need for new capacity. The utility could decide what type of new capacity it needs, then critique the bids received. The utility would be able to consider non-price criteria such as reliability, dispatchability, and other factors in selecting the winning bid.

For states that do not choose to adopt competitive bidding for PURPA and/or other generation sources, a second initiative involves refining current FERC regulations to give additional guidance to the states on how to price QF power administratively. It would attempt to address the problems of utilities being forced to pay too high a price for QF power or to buy capacity they don't need.

The third major proposal concerns non-QF independent power producers, or IPPs. IPPs are defined as non-QF producers that are unaffiliated with franchised utilities in the IPPs' market areas and that otherwise lack significant market power. Examples would be industrial generators with excess capacity that do not qualify as QFs or utility IPPs that sell outside the utility's zone of economic influence.

Unlike traditional utilities, IPPs would not sell in a franchised service territory where they have an exclusive right to sell power to retail customers. Unlike QF producers, they would have no legally mandated right to sell power to a local utility. IPP sales would be arranged solely through competitive business arrangements, such as competitive bidding systems adopted by the states or rate negotiation in the wholesale market.

The profitability of an IPP would be derived solely from its ability to deliver low-cost, reliable power and its willingness to assume investment risks. Utilities would have no legal obligation to contract with an IPP.

IPPs' rates are subject to the Federal Power Act, not PURPA, and the initiative would give these independents the maximum pricing flexibility legally possible under the Federal Power Act, as well as relax other regulatory burdens such as filing and reporting requirements. The FERC is exploring its legal authority under the Federal Power Act to accept as just and reasonable rates that are set through competitive bidding or competitive rate negotiation.

The purpose of the IPPs initiative is to remove regulatory barriers to a potentially significant source of generating capacity and to increase the purchasing options available to utilities. *(Editor's note: For a summary of Edison Electric Institute's testimony before a recent FERC technical conference on this initiative, see the Regulatory Review column in this issue.)*

Although estimates on non-utility generating capacity vary, every investigator has found some existing IPPs potential capacity. A recent study submitted to FERC by the Edison Electric Institute found over 20,000 MWs of non-utility capacity in 1985. (See Sidebar, "1985 Non-Utility Capacity and Generation.") A recent study reported in the trade press identified over 24,000 MWs. And of the country's 380 large industrial generating facilities in existence in 1979, which represent some 17,000 MWs of capacity, only a fraction have since filed as QFs.

Some of this capacity potentially could be made available to utilities in the event of capacity shortages in the years ahead. If utilities are will-

Nothing in the PURPA-IPPs proposals under consideration would dictate industry restructuring or necessarily alter the traditional role of utilities in satisfying their service responsibilities.

ing to buy and industrials are willing to sell, regulators should not stand in the way.

The IPPs and other PURPA-related initiatives are the first of a series of incremental steps in adjusting FERC regulation so that it provides flexibility and choices for both utilities and consumers. The next steps will be a review of bulk power pricing, transmission-related issues, and incentive regulation.

Any reform efforts undertaken by the FERC would not be to "deregulate" the industry or to impose a particular industry structure. Nothing in the PURPA-IPPs proposals under consideration would dictate industry restructuring or necessarily alter the traditional role of utilities in satisfying their service responsibilities. Regulators have demonstrated that they are no better than others at discerning the future, and they should not be in the business of predicting what the best structure for the industry might be.

Is More Competition the Answer?

The gist of the FERC's regulatory response thus far obviously leans toward greater reliance on competition. Competition is not the panacea for all economic ills. However, where increased competition can work and can adequately protect consumers, it is the most effective force available to regulators to promote efficiency and to provide a reward-risk scenario that is fair to utility and consumer alike. The key is to provide sufficient flexibility to allow the industry to respond quickly to market developments.

Some still cling to the notion that the electric utility industry is a natural monopoly in all markets and that all the problems of the last decade will go away with a few minor regulatory fixes. That notion simply ignores reality. It has become clear that in many regards our current system of regulation is outdated. Regulators must proceed carefully to adapt their policies to economic and industry realities, and to provide incentives for the industry to organize itself in the most efficient way possible.

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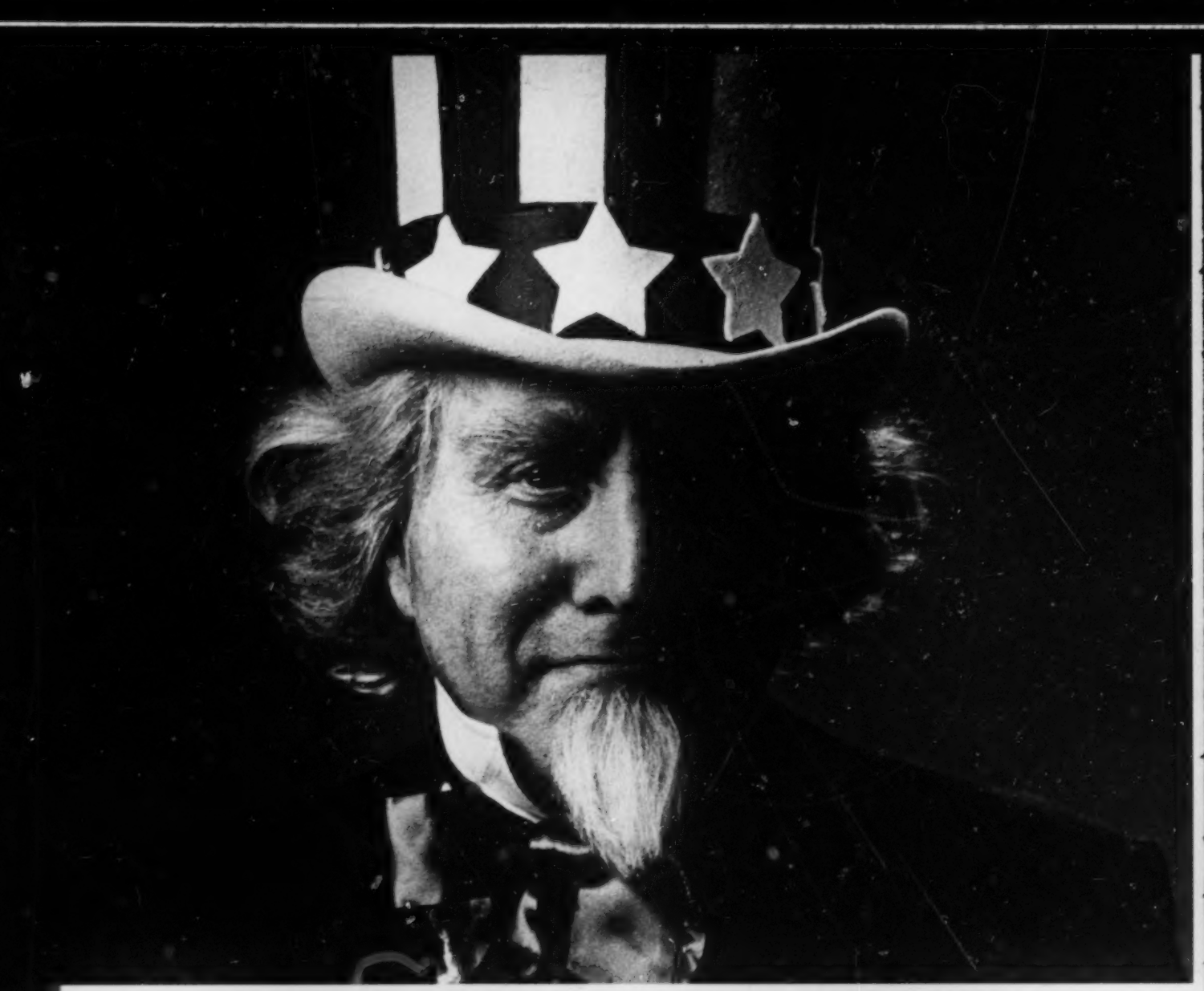

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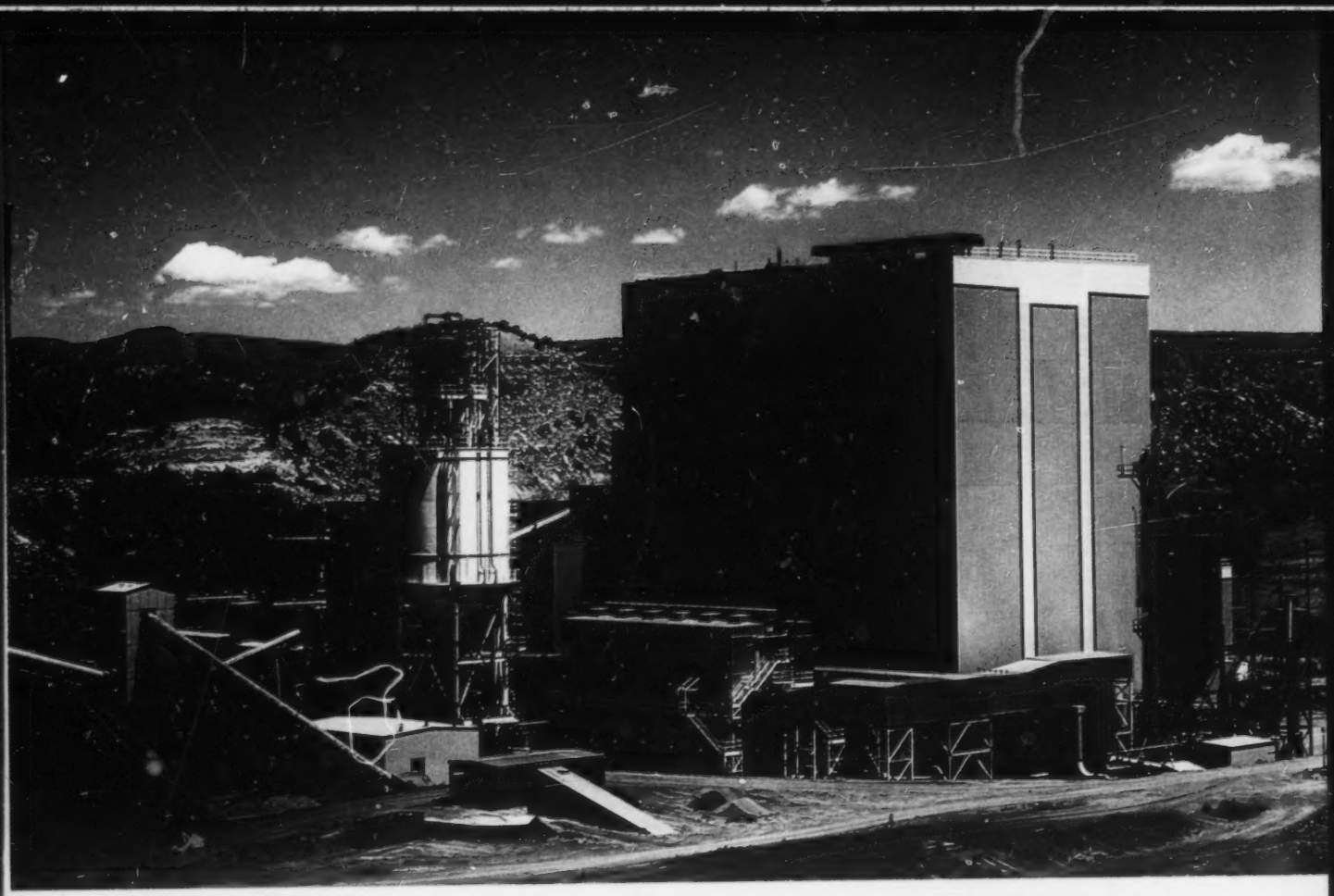


The world's first utility-scale circulating fluidized-bed combustion unit is now operational at Nucla Station.

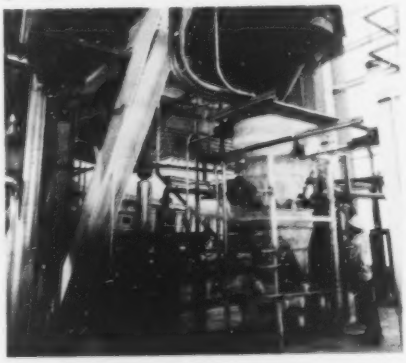
Colorado-Ute Electric Association's innovative decision to become the first U.S. utility to apply circulating fluidized-bed combustion (CFB) on a large scale is already paying off at Nucla Station. Not only has the life of this 25-year-old facility been extended, but efficiency is expected to dramatically increase as well.

While burning low-grade coal, Nucla's generating capacity will grow from 36 MW to 110 MW. And Colorado-Ute avoids the need for costly scrubbers, since in CFB combustion, limestone, shown on the right being fed into the system, is mixed directly with ground coal for a clean burn in which sulfur and nitrogen emissions are reduced.

United's Stearns-Roger Division teamed with Colorado-Ute on this landmark demonstration project. Stearns-Roger provided the design to integrate the CFB boiler into the plant and designed balance-of-plant systems. Colorado-Ute designed the limestone, coal and ash-handling systems, and cooling towers.

During the two-year testing of Nucla Station, Colorado-Ute will continue to lead the utility industry in application of fluidized-bed technology. Even now, Stearns-Roger is designing the next, much larger CFB retrofit for a generating plant in the Midwest.

For more information on our experience with this new technology, call or write our Power Business Development groups in Philadelphia or Denver.



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Vintage Power

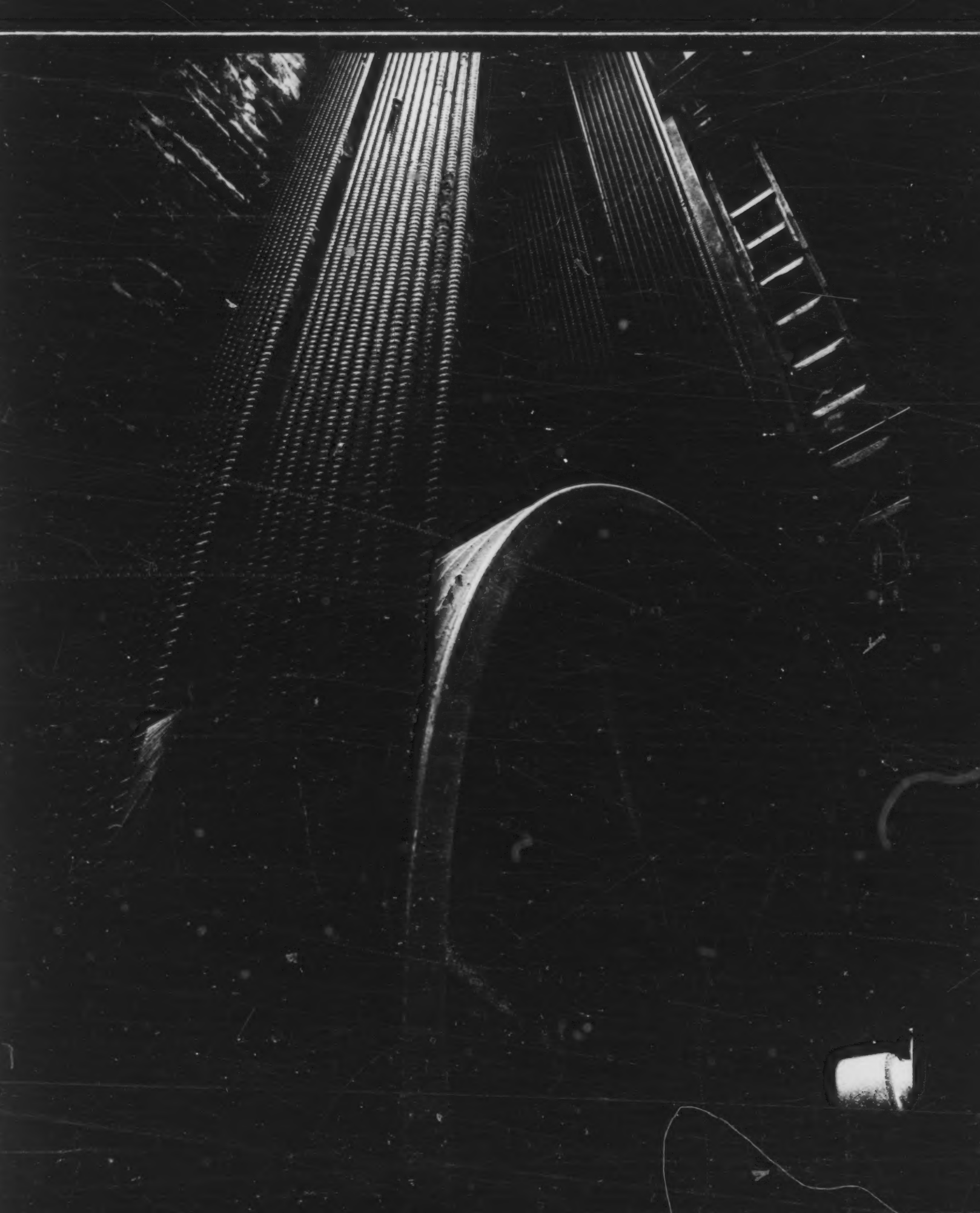
THIS PAST SUMMER, when Potomac Edison Company drained its powerhouse at Dam No. 4 to install a third generator, Kathleen Buckalew took advantage of the opportunity to photograph what are believed to be the nation's only rope-driven hydroelectric generators still in operation. (See "Closing the Generation Gap," p. 27.)

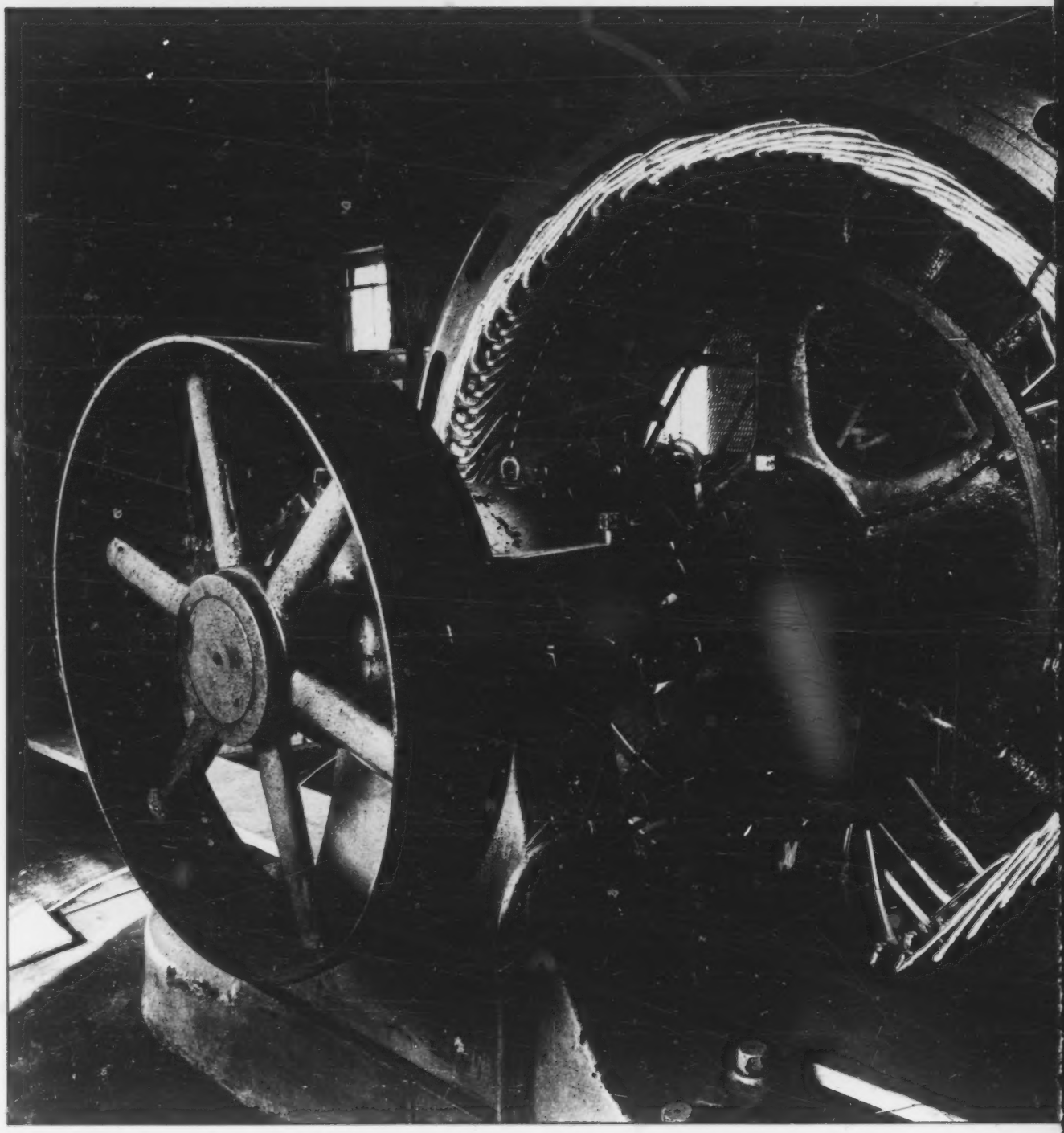
"Naturally, the equipment itself is visually powerful—size alone grants it that. But when you remember that it's been working day in and day out since 1909, it becomes awesome," Buckalew explains.

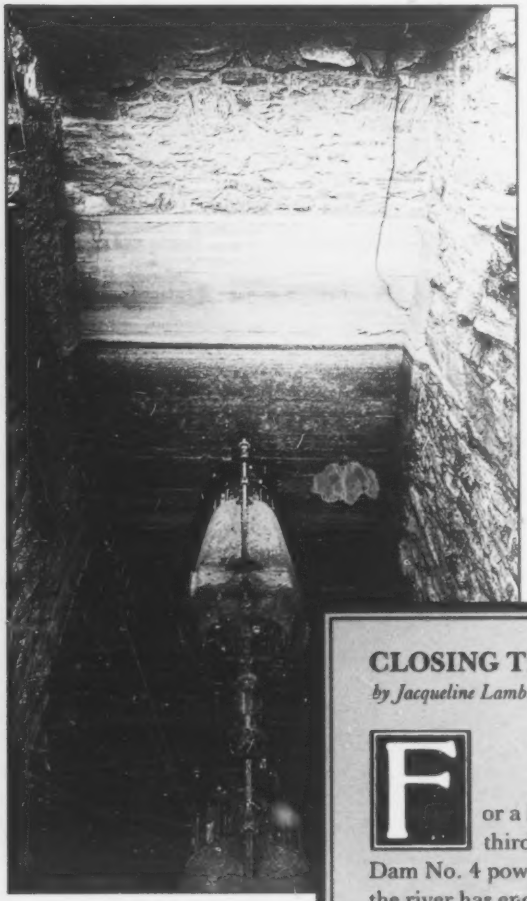
"I think what was most surprising to me, though, is that despite the majesty of the place, it still feels very warm and human. The tools, the workbench . . . you can tell that people who care about their work and care about that plant—people like Tony Robucci—are an essential part of its history."

Currently a photographer in the design department at the National Gallery of Art in Washington, DC, Buckalew's chief photographic interests are portraiture and architecture, both of which find expression in "Vintage Power." She believes the two "are not quite so different from each other as they might seem. Each involves using light and the feeling of light to capture the spirit or character of the subject."

In addition to her work at the National Gallery, Buckalew is a graduate student in photography at George Washington University where she expects to complete her Masters of Fine Arts degree next spring. Her work has been exhibited in the Washington, DC, metropolitan area and beyond, most recently in a one-woman show at a gallery in Provincetown, MA.







CLOSING THE GENERATION GAP

by Jacqueline Lambiase

For a lifetime—almost 80 years—the third turbine bay at Potomac Edison's Dam No. 4 powerhouse stood empty, even though the river has enough water flow to support another generator. But this fall, a brand-new generator filled that gap, going to work along side the two rope-driven models that have been harnessing the Potomac river's power since 1909.

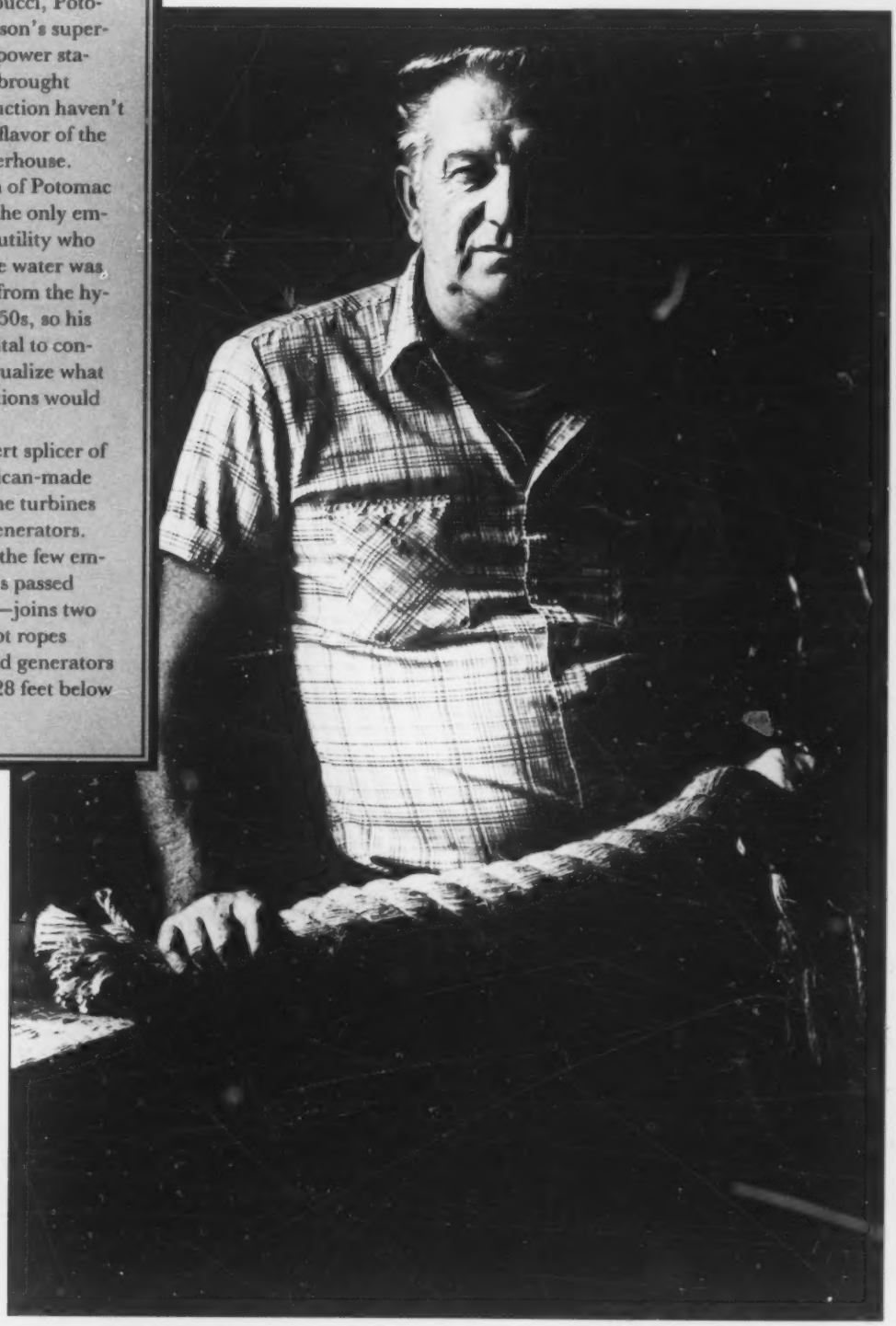
When Potomac Edison decided to add capacity to the hydro station, located on the West Virginia side of the Potomac about four miles north of Shepherdstown, engineers considered installing another rope-driven generator similar to the two already in place. They discovered, however, that that type of generator is no longer in production in the United States.

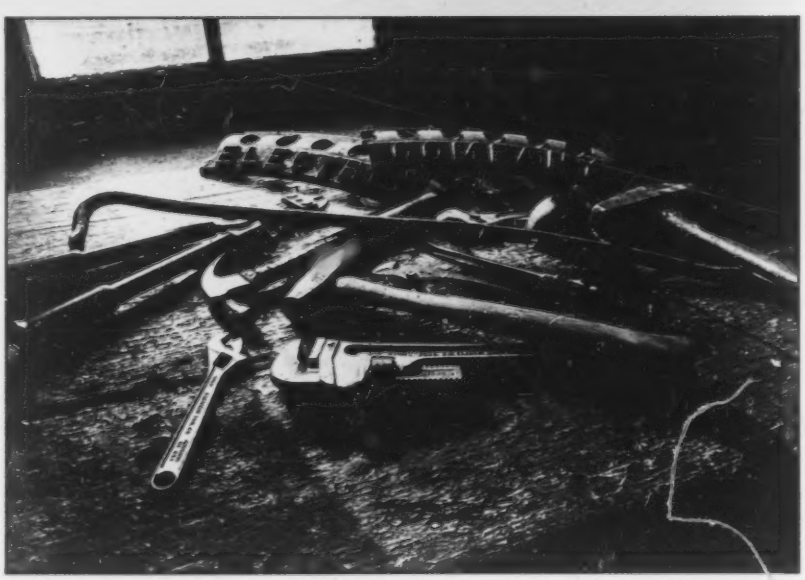
The state-of-the-art hydro generator they ultimately installed is operated automatically by a computerized programmable controller. The new unit's capacity of 900 kilowatts almost equals what the rope-driven units produce together, 1 megawatt.

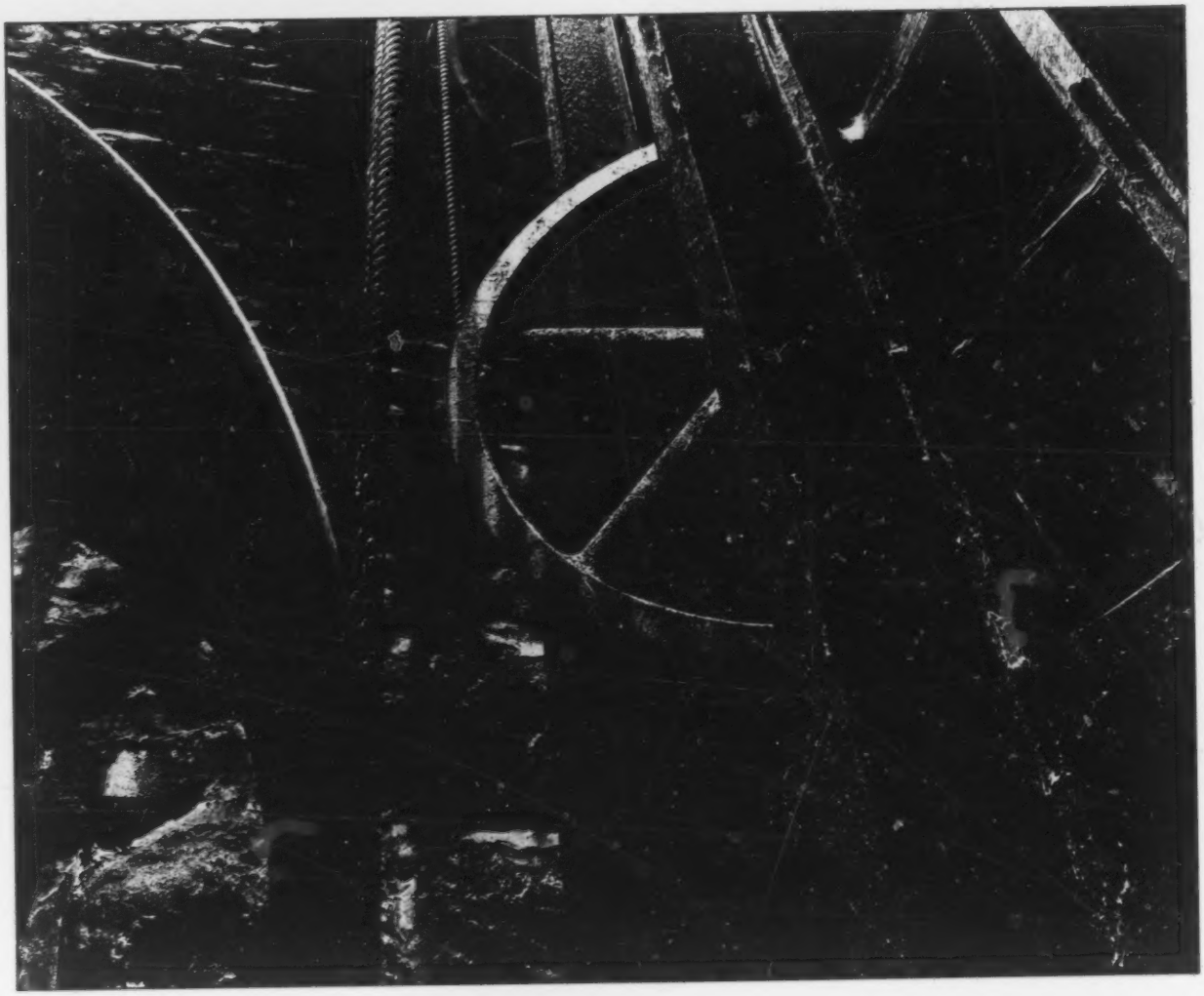
Tony Robucci, Potomac Edison's superintendent of minor power stations, said changes brought about by the construction haven't marred the historic flavor of the gray limestone powerhouse.

A 40-year veteran of Potomac Edison, Robucci is the only employee still with the utility who remembers when the water was completely drained from the hydro station in the 1950s, so his observations were vital to contractors trying to visualize what their working conditions would be.

He's also the expert splicer of the four-strand, African-made ropes that connect the turbines to the two historic generators. Robucci—or one of the few employees to whom he's passed along this dying art—joins two ends of the 1,250-foot ropes which connect the old generators to turbines that are 28 feet below and under water.







Potomac Edison's predecessor company, Potomac Light and Power, acquired the hydroelectric station at Dam No. 4 from the Martinsburg Power Company in 1916. Construction of the plant began in 1906, with the first electricity produced in 1909 by the two rope-driven generators still in operation today.

Dam No. 4, 715 feet long and 18 feet high, was originally constructed in the 1830s to supply water for the C&O canal, which boats used to reach Williamsport, MD. Owned by the National Park Service, the dam did not undergo any changes due to construction at the powerhouse.

Jacqueline Lamblese is a public information representative at the Potomac Edison Company in Hagerstown, MD.

Paul L. Gioia
"In New York we faced all the major regulatory issues..."

The Future of Electric Utility Regulation

A Former Regulator's View

Any consideration of the future of electric utility regulation must begin with a review of the major events of the recent past. The time I served as Chairman of the New York Public Service Commission—April 1981 to February 1987—was probably the most challenging and eventful period in the commission's history, and the same can be said for utility regulation in general. Recent regulatory decisions have had a profound effect on the electric utility industry and have created great uncertainty and confusion about its future. To understand what the future may hold, one must first understand the traditional rules of utility regulation and how they have been affected by recent events.

In New York we faced all of the major regulatory issues: double-digit rate increases, the completion or abandonment of nuclear projects in which very large investments had been made but which no longer appeared to be economic, the treatment of investments in abandoned projects, the development of phase-in plans for high-cost new capacity, prudence reviews that were more extensive and complex than any previously undertaken, proposals to exclude from rate base "excess" capacity, and proposals to adjust rate base to reflect the economic value of new capacity rather than the prudently incurred cost of that capacity.

All of these issues presented factual and policy questions that were complex and, to a large extent, unprecedented. The job of regulators was made even more difficult by a hostile public and political environment and the related pressure to render decisions to the satisfaction of the general public, regardless of their consistency with previous regulatory decisions and long-term policy goals.

Regulators' responses to these issues and to the related political pressure have varied throughout the country. Nonetheless, I think it is fair to say that as a result of the totality of regulatory decisions made during the past several years, the generally accepted body of rules that has guided the development of the electric utility industry for almost half a century has been seriously undermined.

Thus, the key question about the future of electric utility regulation becomes whether or not regulators will be able to construct a new system of credible regulatory rules from the wreckage of the recent past and what the new body of rules will look like.

Clearly, the old rules were very painful to apply in an environment of rising electricity prices and large amounts of uneconomic and, to some extent, unneeded new capacity. What is not clear, however, and what is important for regulators to consider, is whether or not the old regulatory rules are fundamentally flawed. Are they forever outdated by advances in technology? Have they become a permanent hindrance to new opportunities for increased economic efficiency? Or, are they fundamentally sound, albeit ill-equipped to deal with an aberrational period in the history of the industry? A temporary period marked by an extraordinary confluence of negative events, including a costly experience with nuclear construction, oil price shocks, unanticipated declines in demand, and record levels of inflation and interest rates?

Paul L. Gioia, former Chairman of the New York State Public Service Commission, is now Senior Vice President at First Albany Corporation.

The Regulatory Compact

The rules governing utility regulation are generally referred to as the "regulatory compact." Although the compact is not a specific written agreement between a utility and the agency that regulates it, it is a well-established body of rules based upon general constitutional principles, landmark United States Supreme Court decisions, federal and state statutes, and regulatory policy and tradition.

The fundamental goal of the regulatory compact is to further the public interest in the development of an adequate, reliable, and reasonably priced supply of electricity. Such a supply is viewed to be vital to the economic development of the nation and the welfare of its citizens. The compact assumes a utility is granted a franchise to deliver an essential public service. In return for this special privilege, a corresponding obligation is imposed upon the utility to meet all industrial, commercial, and residential needs and to make the long-term plans and large commitments of capital needed to ensure that adequate service will be available in the future.

The compact also imposes upon a utility standards of safety and reliability as well as extensive rules concerning its operating practices and its relationship with its customers. To enable the utility to meet these requirements and to raise necessary capital, the utility is allowed to recover all expenses reasonably incurred in providing service and to earn a reasonable return on its investment.

Clearly, the compact is a very conservative arrangement. Generally speaking, it does not provide incentives for innovation or efficiency (beyond basic prudence) nor use competition to spur greater economic efficiency. The assumption is that the electric industry is a natural monopoly and effective competition is not viable. The emphasis is on creating a system that will ensure safe, adequate, and reliable service while simultaneously protecting the public from monopoly power in the provision and pricing of an essential service.

The compact clearly shifts most financial risks from the utility to its customers. Generally, the risks relating to increases in operating costs and to the cost of constructing major facilities are borne by the public. As a result, the financial risk for utility investors is substantially reduced, which, in turn, lowers the cost of capital ultimately paid by customers.

The fundamental legal underpinning of the compact is the constitutional rule that private property cannot be taken for a public purpose without just compensation. Supreme Court decisions in the first half of this century established some general guidelines to ensure that government regulation of utilities did not run afoul of this basic constitutional protection.

One basic requirement laid down by the Court was that a utility is entitled to a fair return on the value of its property devoted to the public service. Initially, the Court required that for ratemaking purposes utility property be valued at replacement cost. After years of debate, this method of valuation was discredited as administratively unworkable and replaced by "prudent investment" valuation. Under this approach, value is based upon the original cost of capital devoted to the utility business, rather than es-

Gioia believes many recent decisions regarding the recovery of investments in nuclear construction projects are inconsistent with the traditional regulatory compact.

J. Tkatch/Unsplash

timates of the current value of specific utility assets.

The prudent investment approach was articulated by Justice Brandeis in a concurring Supreme Court opinion in 1923. In describing what he meant by "prudent investment," Justice Brandeis stated that investments should not be excluded from rate base if, under ordinary circumstances, they would be deemed to be reasonable. However, investments should be excluded from rate base if found to be dishonest or obviously wasteful or imprudent. He further stated that every investment may be assumed to have been made in the exercise of reasonable judgment unless the contrary is shown.

In the *Hope Natural Gas* case in 1944, a majority of the Supreme Court approved the use of prudent investment valuation by the Federal Power Commission. The Court ruled that fair valuation was a *result* rather than a *specific process* and that the prudent investment approach met the constitutional test of fair valuation. The Court also said, however, that it was possible that other methods of valuation could meet constitutional standards as well.

For decades the basic rules regarding utility regulation appeared to work well and were not seriously challenged. Utilities invested massive amounts of capital to construct an extensive, complex, and highly reliable national electric power system. Investors, comforted by the security of utility investments, readily put up the money needed by utilities at relatively low rates. The continuing steady increases in load growth and declining real prices for electricity because of improvements in technology and the construction of larger and more efficient plants provided little basis for questioning the efficiency of the compact.

While it may be impossible to convince the public that paying returns of over 16 percent at certain times will be cheaper in the long run than paying artificially low returns, that is precisely the premise upon which the traditional approach to return on investment is based.

However, the severe problems that arose in the 1970s and 1980s, and the resulting public and political pressure, began to severely test regulators' commitment to these rules. Utilities and their investors became painfully aware that the rules they had relied on were not so clearly defined or extensive as they had assumed and that they could not count on the courts for the quick and decisive enforcement of their rights under the regulatory compact.

The first attack came in the early 1980s with respect to the rule requiring a fair return on equity. We were experiencing a period of extremely high interest rates. Using conventional methods of calculating returns on equity, the New York Commission and other commissions granted returns of 16 percent and higher. Some consumer advocates and elected officials attacked such returns as "obscene." Utilities were benefitting at the expense of customers who were suffering in a difficult economic period, they argued. It appeared only reasonable to the public that utility investors should share their pain by accepting a lower return.

If it is assumed that over the long run increases and decreases in returns to reflect current market conditions will even out, then allowing market-based returns has the fundamental characteristic of making equity investments less risky and, therefore, less costly. While it may be impossible to convince the public that paying returns of over 16 percent at certain times will be cheaper in the long run than paying artificially low returns, that is precisely the premise upon which the traditional approach to return on investment is based.

Although the speed with which regulators increased returns and the level to which they increased returns varied, no fundamental challenge emerged to the basic concept that returns should increase to reflect higher capital costs. So while this aspect of the regulatory compact was strained in recent years, it has survived pretty much intact.

The Compact Challenged

The much more serious challenges were to arise with respect to the recovery of utility investments in nuclear construction projects. Although some of the regulatory actions taken in response to nuclear construction problems were basically consistent with the regulatory compact, I believe several other approaches taken were inconsistent with the compact. In the first group I include prudence disallowances and phase-in plans and in the sec-

ond are excess capacity adjustments, the valuation of rate base according to economic value rather than actual prudent cost, and the disallowance of prudent investments in abandoned projects.

The requirement that utilities be denied recovery of investments imprudently made is an essential element in the regulatory compact. By shifting all of the risks of construction to a utility's customers, the prudent investment rule places the utility in a fiduciary relationship with them. In effect, a utility is using its customers' money to build the plant. If a utility does not diligently exercise its responsibility to manage a major construction project effectively, those customers may be forced to pay for waste and inefficiencies that could have been avoided. Under the prudent investment approach, only the intervention of the public utility commission can protect the public from the imposition of such unjustified costs.

Obviously, no one expected nuclear projects to suffer the tremendous cost escalations that eventually occurred. The greatest share of the responsibility for these increases can be fairly attributed to changes and uncertainty in federal nuclear regulation, severe inflation in construction costs, and high interest rates.

However, utility management had and has a continuing duty to deal with these extremely difficult and challenging problems. Under the compact, utility management had a responsibility to manage these projects directly and aggressively, and that responsibility could not be delegated to any other party. It is also clear that regulators had a fundamental responsibility to review these construction projects and make some judgment as to the prudence of utility management.

I am not suggesting that an after-the-fact prudence review is a very effective or fair way to evaluate the management of a nuclear construction project that took 15 years to complete and cost $5 or 6 billion. As a practical matter, however, it has been the only device available.

Placing all of the prudent investment in a large generating plant in rate base at one time simply does not make any sense. No rule should be applied ritualistically regardless of the consequences.

While one might object to the reasonableness of a particular prudence review or disallowance, under the circumstances, such reviews are unavoidable and should have been anticipated by utilities and the financial community. In New York we conducted the most thorough review possible and held utility management to the standard of reasonableness articulated by Justice Brandeis.

Likewise, while phase-in plans are not required under traditional utility regulation, I view them too as a practical necessity and not inconsistent with the regulatory compact if full recovery for prudent investment is allowed, including a full return on the income deferred during the phase-in period. Placing all of the prudent investment in a large generating plant in rate base at one time simply does not make any sense. No rule should be applied ritualistically regardless of the consequences. Phase-in plans allow these costs to be absorbed more gradually while allowing the utility a full, although somewhat delayed, recovery of its prudent investment.

Some other recent approaches to dealing with nuclear projects are, in my view, inconsistent with the regulatory compact. One such approach is the total denial of recovery of an investment in an abandoned construction project on the grounds that the investment was not "used and useful." In New York, the Commission continued to support recovery of prudent investment in abandoned projects, and we occupied the rather lonely position of also allowing a full return on the unamortized balance for a recovery spread over a number of years.

We did not support recovery solely out of concern for the financial condition of the utilities but because we believed it to be in the long-term public interest. Under the traditional regulatory compact, utilities are under an obligation to ensure that sufficient power is available to supply all needs. That means that utility decisions to build are based on public need—not on maximization of profits for the utility. The benefits of a construction project that turns out to be an economic success flow to the utility's customers, not to stockholders. In addition, the decision to build a plant and the question of need are subject to governmental review; they are not made unilaterally by the company.

We were aware that a policy that denied recovery of a prudent in-

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The bottom line is that the common understanding that fostered the development of the electric utility industry in this country no longer exists. The obvious question, then, is where do we go from here?

vestment because of changed circumstances would discourage utility investments needed to ensure adequate capacity and create a greater risk that at some time in the future the supply of electricity in New York would not be sufficient to meet the demand. This is one of the risks that we have not been willing to assume in the past and that the compact was designed to minimize. Finally, we did not want to create a perverse incentive for a utility to complete a project that was no longer needed or economic because that is the only way to recover its investment.

Another suggested approach to dealing with the high cost of nuclear capacity is to allow rate base to be increased only by the economic value of the investment rather than by its prudent cost. For example, in New York the Attorney General and Consumer Protection Board recommended that the rate base of the utilities building Nine Mile 2 be increased only to the extent of the estimated cost of substitute coal capacity.

This approach has a lot of public appeal. After all, why should consumers pay more than the least-cost alternative?

The problem with this position is that it ignores the history that led to the general adoption of prudent investment valuation. As previously noted, in the early part of this century the Supreme Court required that rate base be valued on the basis of current market value. It was eventually recognized that such an approach was administratively unworkable and was necessarily somewhat circular since the value of utility property is dependent upon the return allowed by regulators. Furthermore, the proponents of this position were not suggesting that the value of all utility property be set at economic value—which would result in a much larger, not smaller, rate base. Instead, they proposed that one asset that appeared to be uneconomic be singled out for different valuation. This approach is both unfair and inconsistent with the regulatory compact.

In New York we also viewed excess capacity adjustments as inconsistent with the regulatory compact. In our view, although the compact requires utility investors to assume the risk of imprudent utility actions, it does not require them to assume the risk of changes in demand beyond the company's control. Obviously, it is not always possible to match capacity precisely with demand, despite the most conscientious forecasts. And, if capacity is delivered in advance of immediate need due to unusual and unforeseen events, that is part of the price paid in a system which places a very high premium on adequate supply, reliability, and low capital costs.

Proponents of proposals to deny recovery of abandoned projects and of "excess" capacity and to value new investments on an "economic" basis rather than a cost basis argue that these approaches are more market based than traditional regulation and more closely approximate what happens in an unregulated market. They point out, for example, that an unregulated producer could not expect consumers to pay for a failed investment, nor could he raise the price of his product because he spent more on the construction of his plant than his competitor.

These arguments have merit and are a legitimate basis for a debate concerning future regulatory policy. However, as a party to the regulatory compact, regulators are not free to change the rules in the middle of the game. Whatever the virtues of a more market-based approach to regulation, construction projects now coming on line were built under a different set of rules, and investors relied on those rules in committing their money and in the return demanded on their investment.

I feel strongly that regulators have an obligation to treat those investors fairly and, perhaps even more important, to protect the credibility of government. In public affairs, as in most other areas, credibility counts a great deal. As a member of the New York Commission, I was convinced that if we failed to meet our obligation to utility investors in order to avoid the short-term consequences of a difficult problem, the Commission's credibility and the people of New York would suffer in the long run.

Notwithstanding our efforts in New York to deal with these problems within the bounds of the regulatory compact, our utilities suffered a great deal from their involvement in nuclear construc-

According to Gioia, attempting to control and coordinate power supply from a number of separate producers could create "an administrative and legal morass."

tion projects. And it probably matters little to a risk-averse utility investor whether his loss occurred inside or outside the regulatory compact. Furthermore, in some jurisdictions the regulatory compact was ignored or openly rejected and, even in New York, the commitment to the compact was certainly not shared by all segments of state government.

The bottom line is that the common understanding that fostered the development of the electric utility industry in this country no longer exists. The obvious question, then, is where do we go from here?

The Future Short and Long

I do not expect the demise of the regulatory compact to be greatly lamented, at least not in the near future.

The major advantage of the compact was its ability to allow large amounts of capital to be raised for construction projects at low cost. In a period of sufficient capacity, this advantage is less valuable. In addition, the recent experience with nuclear projects and the environmental costs imposed on large coal plants has called into question the economic feasibility of capital-intensive central generating stations. Furthermore, unexpected declines in load growth in the late 1970s and early 1980s have reduced our confidence in our ability to make accurate long-term forecasts. Currently there is a great deal of disagreement as to what our future capacity needs will be and to what extent energy conservation and load management can provide effective substitutes for new capacity. In the near future, commissions will consider construction as a last resort and actively promote all other alternatives. Because of the severe financial difficulties sustained by many utilities and the breakdown of the regulatory compact, utilities do not want to build new plants and will cooperate rather than resist efforts to avoid new construction.

Meanwhile, the Public Utility Regulatory Policies Act of 1978 (PURPA) has performed an extremely important function by opening power generation to some form of competition that can provide a useful comparison with utility construction. It has also encouraged the greater use of cogeneration, which has inherent efficiency advantages. Regulators will continue to encourage the development of cogeneration and small power production, but with increasingly greater concern about purchasing unneeded capacity and inflated avoided-cost payments. For example, the Federal Energy Regulatory Commission and a number of states are moving in the direction of establishing bidding procedures for the purchase of non-utility power. This is a welcome effort to rationalize this process, by eliminating the subsidies which currently exist, at least in some parts of the country, and giving greater consideration to factors such as need, reliability, and environmental impact. It is uncertain, however, how much economic alternative energy production is actually out there. Regulators are also becoming concerned about the reliance of so many cogenerators on natural gas and the future deliverability and price of gas. *(Editor's note: FERC*

Chairman Hesse outlines the Commission's proposal in an article beginning on page 16. Edison Electric Institute's testimony before a recent FERC technical conference on competitive bidding is summarized in a review column on page 42).

It seems to me that the crucial factor that will determine the direction of future regulation in the long term is the extent to which demand for new capacity develops. As long as our capacity needs can be met by small increments and the reliability of our system is not jeopardized by a wide dispersion of small generators, there will continue to be an environment conducive to some form of competition. However, if, despite all of our efforts to avoid the need for new capacity, substantial increases in supply become necessary, it appears to me that utilities should and will get back into the business of building new capacity.

In the telephone industry, major technological breakthroughs rendered obsolete the traditional and very capital-intensive means of providing long-distance service. Microwave and fiber optics technology made entry into the long-distance market and competition feasible. I am not aware of any similar technological advances in the electric power industry. The continued economic feasibility of large central generating stations cannot be dismissed nor can their advantages with respect to system reliability and central dispatch. If major capital-intensive facilities are to be built, it seems to me that the vertically integrated structure of the utility industry will continue to make sense—and true competition and deregulation will become less viable.

The commitment of large amounts of capital will require protections to investors similar to those provided by the regulatory compact. The most likely alternatives to utility construction under these circumstances would be construction by the government or by non-utilities with long-term contracts. Government construction would, of course, place all construction risks on electric customers, and non-regulated developers would almost certainly seek contracts that would shift at least as much risk to customers as the regulatory compact does.

The continued economic feasibility of large central generating stations cannot be dismissed nor can their advantages with respect to system reliability and central dispatch.

In addition, the operation of large power plants will have to be controlled and coordinated with the power supply system. Such control and coordination is one of the advantages of a vertically integrated and regulated utility. Attempting to control and coordinate the operation of these plants through a number of separate producer contracts has the potential of creating an administrative and legal morass that would, I believe, outweigh any benefit that might be achieved as a result of lower construction costs.

Non-utility power producers could continue to supplement the basic utility-provided system, to the extent that additional energy and capacity is economic and consistent with reliability standards and long-term power supply planning goals.

I expect that once the utilities have recovered from their recent traumatic experience, some of their aversion to new construction will dissipate. After all, generation is a major part of their business and they have a great deal of experience and expertise in that area, notwithstanding the recent difficulties with nuclear construction. Also, without major construction programs, utility cash flow and financial strength will steadily improve. After reviewing other opportunities for capital investment, utilities will find investments in needed generation attractive. At first, the utility approach to construction will be very conservative, with smaller, less capital-intensive projects. Eventually, however, I believe that major construction projects by utilities could again become feasible either to provide additional capacity or to replace existing capacity.

At that point a new regulatory compact would have to emerge. Any new understanding would almost certainly be more carefully designed and better articulated than the current one. A definite statement of the state's commitment to more capacity will probably be required, as will an express statement of the rules concerning the recovery of utility investment and financial support during the construction period. Utility management will be much more aware of both its risks and responsibilities in major construction projects and will be more directly and actively involved in construction planning and oversight.

The recent experience in the electrical utility industry has caused se-

rious financial hardship to utilities and their investors and a crisis of confidence in one of the nation's most important industries—an industry that over many decades has fulfilled all of its responsibilities to the public and its investors remarkably well. If it were clear that our recent difficulties were the dislocations associated with improving technology and changes in the fundamental economics of the industry, then the future course for the industry and regulation might be more readily apparent. However, as I suggested earlier, I do not believe that is certain. It may be that we have experienced a set of short-term economic and regulatory problems that will never be repeated. If so, they do not provide a sound basis for drastic changes in the industry structure or utility regulation.

As we move forward in this uncertain environment, we should not dwell too long on the pain and disappointment of recent years. We must learn from those experiences, but we must not let them constrict our view of future. The electric utility industry and the public policymakers who regulate it should engage in a full and open-minded discussion about the future of the industry and regulation. They should take advantage of this opportunity to consider objectively various alternatives to the industry's current structure and to current regulatory policy, adopting whatever policies and approaches they find will best meet the continued strong public interest in safe and reliable electric service.

However, it is important that the traditional roles of utilities and regulatory policy not be rejected on the basis of the unexamined assumption that they were the underlying causes of our recent problems. To the extent that the traditional structure of the industry and the rules of regulation can continue to serve the public well in the future, they should be preserved, with whatever modifications are warranted by an objective analysis of our experiences in the recent past.

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REGULATORY REVIEW

ONE STEP AT A TIME—ELECTRIC UTILITIES SUPPORT COMPETITIVE BIDDING EXPERIMENT

The Federal Energy Regulatory Commission (FERC) can take an important incremental step in increasing electric utility competitive options by issuing a policy statement to encourage an all-source competitive bidding experiment for new generation, the electric utility industry told the Commission in October.

Thomas R. Kuhn, executive vice-president of the Edison Electric Institute (EEI), testified before a FERC technical conference on competitive bidding for new electric power generation. He stated that EEI, the association of America's investor-owned electric utilities, agrees the Commission should take an evolutionary approach toward non-traditional regulation of third-party independent power producers (IPP) by adopting a competitive bidding experiment. "After evaluating the results of those experiments, the commission will be able to determine what regulations, if any, are necessary and desirable in this area," Kuhn said.

FERC conducted the technical conference to explore policies toward IPPs that the commission believes would aid them in enhancing competition in bulk power markets.

"EEI is not adopting a 'wait and see' approach," Kuhn said. "This is a 'go forward, but look where you are going' approach. Our members are in support of an evolutionary approach, which carefully considers all relevant questions and tests the answers in light of practical experience gained by voluntary experiments. In addition, this approach will best serve the objectives to provide maximum flexibility for utility supply options and at the same time test the efficacy of a variety of approaches rather than relying on a single solution."

Kuhn also recommended that a policy statement be issued by FERC acknowledging that current law allows for purchases from IPPs, and to encourage utilities, in cooperation with the states, to propose an all-source competitive system on an experimental basis. "This approach would be perfectly consistent with actions the Commission has already taken on selected economic power supply projects developed outside the scope of traditional utility regulation and would avoid the legal, technical, and financial uncertainty which would inevitably surround any more radical attempt to restructure the industry immediately by changing the Commission's regulations," Kuhn said. Kuhn was referring to the Commission's proposed all-source bidding concept, which FERC Chairman Hesse has indicated will result in a Notice of Proposed Rulemaking in the near future. (*Editor's note: Chairman Hesse outlines FERC's proposal in an article beginning on page 16.*)

Kuhn further stated that such a policy statement should stress that, due to the utility obligation to serve, utilities must retain maximum flexibility in selecting supply options with complete control over non-price factors such as reliability. "The policy statement should affirm that purchases from IPPs are only one option for meeting the utility's obligations and are not to be given preference over, or impair, other economic and competitive supply options."

Kuhn emphasized, "the Commission should not issue any rulemaking which would change the basic rules of the game for a new class of suppliers unless a thorough analysis with ample public input demonstrates that a fundamental restructuring of the electric utility industry is in the long-term best interest of electric consumers."

Kuhn also pointed to the need to maintain reliability and adequacy of power supply, and he stressed that before FERC proceeds with a rulemaking, certain principles regarding competitive bidding must apply. The principles include: allowing the host utility to determine the need, size, timing, and comprehensive selection criteria of any new independent power plant; allowing utility participation in competitive bidding both within and outside its service territory; insuring competition is level without regulatory preference for, or handicap against, any group; maintaining the voluntary nature of access to transmission systems; and discouraging independents from cherry-picking larger utility customers to the detriment of the remaining customers.

EEI believes that the technical conference held October 22–23 should be considered the first formal step in developing a record that continues the debate on these complex issues. It is hoped that FERC will thoroughly examine the EEI proposal and will continue to develop a careful and deliberate record that ensures that consumer interests are preserved. Such a record has been produced to examine reforms to the Public Utility Regulatory Policies Act, and EEI once again encouraged FERC to move forward with a rulemaking on that subject.

Contributed by the Public Information Department of Edison Electric Institute.

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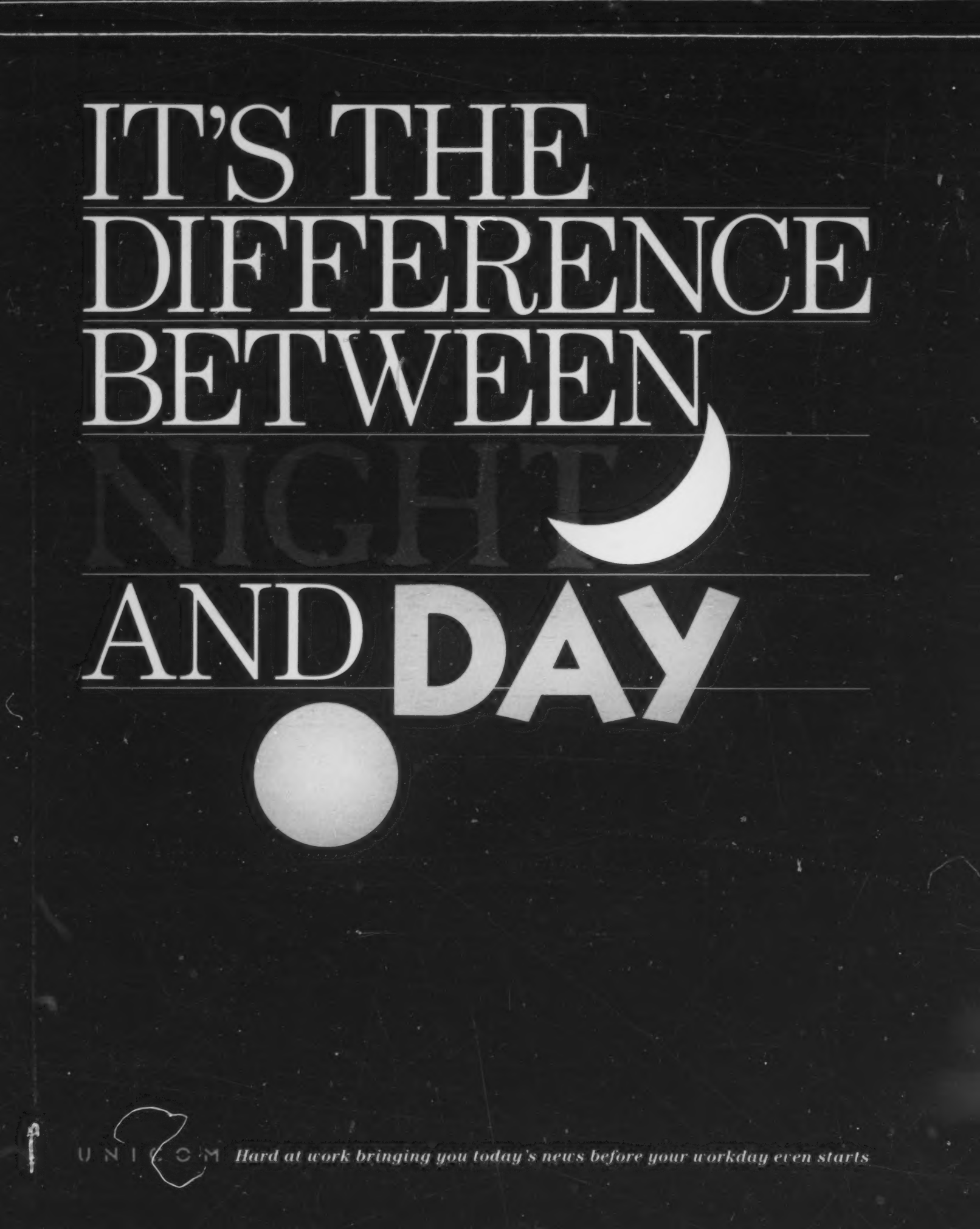

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FINANCIAL REVIEW

FIRST QUARTER EARNINGS PER SHARE DECLINE

First quarter 1987 earnings per share (before extraordinary items) for the investor-owned electric utility industry dropped 4.9 percent over the 1st quarter of 1986. First quarter earnings per share were $0.78 on revenues of $31.3 billion, compared to last year's 1st quarter earnings of $0.82 on revenues of $31.2 billion.

While electric operating income for the industry rose by 5.9 percent, drops in "Other Utility Operating Income" (due to lower gas sales) and "Other Income & Deductions" of 17.1 percent and 48.4 percent, respectively, were largely responsible for the decline in quarterly earnings per share. A portion of the Other Income and Deductions decline was caused by separately accounting for phase-in revenues.

Other factors that influenced quarterly earnings per share include:

- sluggish 0.2 percent growth in operating revenues (even though sales were up 1.6 percent) caused by price decreases, tax reform, lower rates of return on equity granted by commissions, and mild weather.
- a 16.2 percent decline in allowance for funds used during construction (AFUDC), associated with a 6.9 percent drop in construction work in progress (CWIP);
- a 1.2 percent drop in total electric operating expenses caused by cost cutting programs, a 7.4 reduction in fuel costs, and a 12.4 percent drop in income tax expenses reflecting a decrease in deferred taxes and investment tax credits resulting from tax reform; and
- a 1.9 percent decrease in quarterly net interest expenses caused by numerous utilities taking advantage of lower interest rates by refinancing long-term debt during 1986.

The return on average common equity (ROE) (before extraordinary items) for the first quarter of 1987 was down slightly from 13.8 percent in the fourth quarter of 1986 to 13.6 percent. This movement was attributable to an increase in retained earnings (11.4 percent) and a reduction in the ROE authorized by public utility commissions causing an offsetting decrease to net income.

New to the income statement are two line items which break out deferred costs and revenues associated with utilities' plant phase-in plans. These line items capture the net effect of the industry's phase-in plans.

Costs Deferred Under Rate Phase-in Plans represents the net effect of (1) companies that are deferring operating costs associated with a phase-in plan until a later period by reducing current operating expenses (thus increasing operating income) and (2) companies that are recognizing prior deferred operating costs by increasing current operating expenses (thus decreasing operating income). Of the twelve companies reporting on this line item, seven are in the deferral stage and five are in the amortization phase.

Phase-in Deferrals include non-cash revenues recognized during phase-in plan cost deferral periods. Generally, this is a return on plant investment and the carrying charges associated with the deferrals. Of the sample, thirteen companies reported income on this line, while one company reported a reduction to income representing the reversal of a prior period deferral of revenue associated with a partial plant disallowance determined after the phase-in plan went into effect.

Since phase-in deferrals of cost and revenue represent non-cash items and thus affect quality of earnings, separately displaying these amounts provides a better picture of the industry's quality of earnings. The net effect of phase-in plans for the first quarter was a non-cash increase to net income of $387 million, or 7.2 percent of net income.

Due to the variety of plant phase-in plans, it was not practical to identify the deferral amounts for previous periods. Line items such as Other Operation & Maintenance Expenses, Depreciation & Amortization, and Other Income contain the bulk of prior-period phase-in deferrals. Comparisons of these line items with previous periods thus will be slightly distorted. The identification of the non-current portion of capital lease obligations on the balance sheet beginning this quarter will also distort prior-period comparisons. Companies' prior-period capital lease obligations were placed variously under Long-term Debt, Utility Plant, Other Current Liabilities, and Other Deferred Credits.

AFUDC, the largest component of non-cash earnings, as a percentage of net income available for common, dropped from 36.8 percent a year ago to 32.4 percent, continuing the downward trend that began in 1983. AFUDC plus the net effect of phase-in deferrals as a percentage of net income available for common was 40.7 percent. There are other non-cash earnings accruals, but these are not separately reported in our survey and may not be overly significant.

Tables 1 and 2 are based on unaudited reports submitted by a sample of investor-owned electric utilities representing approximately 94 percent of the industry's revenues and 93 percent of its total assets. The data were adjusted to represent the entire investor-owned electric utility industry.

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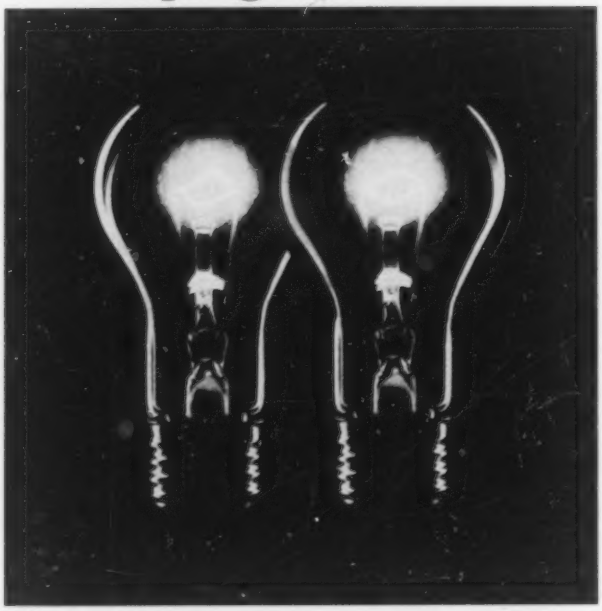

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Table 1
Investor-Owned Electric Utility Industry Statement of Income (Unaudited)
(Millions of Dollars)

	Three Months Ending March 31,			Twelve Months Ending March 31,		
	1987	1986	Percent Change[5]	1987	1986	Percent Change[5]
Total Electric Operating Revenues[1]	$31,309	$31,234	0.2	$128,804	$124,844	3.2
Electric Operating Expenses						
Fuel	$ 7,657	$ 8,270	(7.4)	$ 31,671	$ 36,047	(12.1)
Other Operation & Maintenance	8,917	8,313	7.3	35,980	32,434	10.9
Depreciation & Amortization	3,053	2,774	10.0	11,808	10,618	11.2
Costs Deferred Under						
Rate Phase-In Plans[2]	(195)	—	N.M.	(195)	—	N.M.
Taxes Other Than Income Taxes	2,403	2,378	1.0	9,592	8,993	6.7
Income Taxes: Federal & Other	1,663	1,523	9.2	6,681	5,618	18.9
Deferred Income Taxes	935	1,023	(8.6)	5,516	4,503	22.5
Investment Tax Credit, Net	215	664	(67.7)	827	1,969	(58.0)
Total Electric Operating Expenses	$24,647	$24,945	(1.2)	$101,880	$100,182	1.7
Electric Operating Income	$ 6,662	$ 6,289	5.9	$ 26,924	$ 24,662	9.2
Other Utility Operating Income	623	752	(17.1)	1,354	1,442	(6.1)
Total Utility Operating Income	$ 7,285	$ 7,041	3.5	$ 28,278	$ 26,104	8.3
Other Income & Deductions—Net	415	805	(48.4)	2,237	2,306	(3.0)
Phase-in Deferrals[2]	192	—	N.M.	192	—	N.M.
Allowance for Other Funds Used						
During Construction	962	1,166	(17.5)	4,057	4,854	(16.4)
Total Income Before Interest Charges	$ 8,855	$ 9,012	(1.7)	$ 34,765	$ 33,264	4.5
Interest Charges						
Interest on Long-Term Debt	$ 3,626	$ 3,774	(3.9)	$ 14,884	$ 14,791	0.6
Other Interest Expenses & Charges	248	252	(1.6)	962	998	(3.6)
Allowance for Borrowed Funds Used						
During Construction	(551)	(640)	(13.9)	(2,282)	(2,754)	(17.1)
Net Interest Expenses & Charges	$ 3,323	$ 3,386	(1.9)	$ 13,565	$ 13,035	4.1
Net Income Before Extraordinary Items	$ 5,533	$ 5,626	(1.7)	$ 21,201	$ 20,229	4.8
Extraordinary Items	(190)	(1)	N.M.	30	(1,668)	N.M.
Net Income	$ 5,343	$ 5,625	(5.0)	$ 21,231	$ 18,561	14.4
Preferred Dividends Declared	673	715	(5.8)	2,713	2,870	(5.5)
Net Income Available for Common	$ 4,669	$ 4,910	(4.9)	$ 18,518	$ 15,691	18.0
Common Dividends Declared	3,089	3,073	0.5	12,224	11,870	3.0
Additions to Retained Earnings	$ 1,580	$ 1,837	(14.0)	$ 6,294	$ 3,821	64.7
Average Shares Outstanding[3]	6,202	6,007	3.2	6,179	5,930	4.2
Earnings Per Share Before						
Extraordinary Items[4]	$ 0.78	$ 0.82	(4.9)	$ 2.99	$ 2.93	2.0
Earnings Per Share After						
Extraordinary Items[4]	$ 0.75	$ 0.82	(8.5)	$ 3.00	$ 2.65	13.2
Common Dividends Per Share[4]	$ 0.50	$ 0.51	(2.0)	$ 1.98	$ 2.00	(1.0)

[1]Revenues are adjusted for intra-industry sales for resale of electricity.
[2]Values for prior quarters not available.
[3]Adjusted for stock splits.
[4]Based on average shares outstanding as reported to EEI by survey respondents and adjusted for stock splits.
[5]Percent changes may reflect changes due to greater detail/roundings.
N.M.—Not Meaningful

Table 2
Investor-Owned Electric Utility Industry Balance Sheet (Unaudited)
(Millions of Dollars)

Assets	March 31, 1987	March 31, 1986	Percent Change
Utility Plant[1]			
Utility Plant (Including Nuclear Fuel)	$392,208	$355,061	10.5
Less Accumulated Depreciation	107,725	96,030	12.2
Total	$284,483	$259,031	9.8
Construction Work in Progress	77,777	83,570	(6.9)
Net Utility Plant	$362,260	$342,601	5.7
Investments	9,990	8,647	15.5
Current Assets	39,500	39,137	0.9
Deferred Debits	22,974	18,809	22.1
Total Assets	$434,724	$409,194	6.2
Capitalization & Liabilities			
Capitalization			
Common Stock	$ 88,905	$ 85,220	4.3
Retained Earnings	51,764	46,482	11.4
Preferred Stock	29,140	30,969	(5.9)
Long-Term Debt	162,536	150,100	8.3
Total Capitalization	$332,345	$312,771	6.3
Current Liabilities			
Short-Term Debt	$ 4,663	$ 3,995	16.7
Long-Term Debt Due Currently	5,691	6,963	(18.3)
Other Current Liabilities	24,962	28,327	(11.9)
Total Current Liabilities	$ 35,316	$ 39,285	(10.1)
Deferred Credits			
Capital Lease Obligations, Non-Current Portion[2]	$ 5,330	—	N.M.
Accumulated Deferred Income Taxes	$ 37,621	$ 32,594	15.4
Accumulated Deferred Investment Tax Credits	16,814	16,115	4.3
Other Deferred Credits	7,298	8,430	(13.4)
Total Deferred Credits	$ 67,063	$ 57,138	17.4
Total Capitalization & Liabilities	$434,724	$409,194	6.2

[1]Includes non-electric utility plant.
[2]New line item. Values for prior quarters not available.

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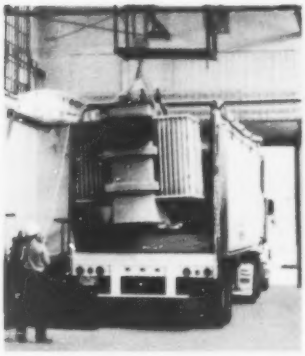

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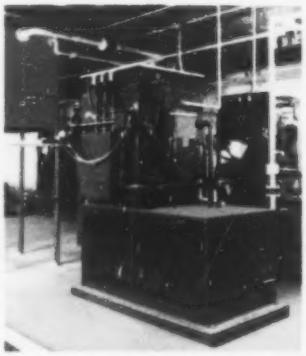

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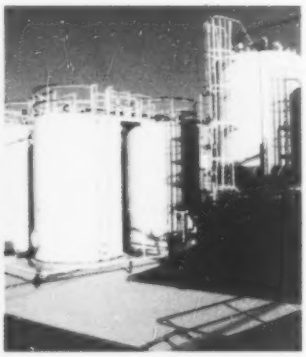

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STATISTICAL REVIEW

WHERE THE MONEY GOES: THE NEW CONSUMER PRICE INDEX EXPLAINED

by John Hinrichs

The Bureau of Labor Statistics (BLS) has spent five years and more than $40 million revising the nation's most widely cited measure of inflation, the Consumer Price Index (CPI). Periodic revisions are necessary to account for the widespread changes in the average American family's lifestyles that occur over time.

The CPI reflects average household spending patterns. The latest revision updates those patterns to the 1982–84 period. The old series relied on 1972–73 patterns. Table 1 summarizes the changes in economic and demographic characteristics of urban households between these two periods. The new CPI series reflects these updated factors.

The CPI measures changes in prices for a fixed market basket of goods and services. These prices are shown in index form where 1967 equals 100. Thus, a CPI of 333.1 now means that the same goods and services which cost $100 in 1967 cost $333.10 today.

CPIs are published for two population groups: (1) CPI-U, for all urban consumers, representing the spending habits of 80 percent of the U.S. population; and (2) CPI-W, for urban wage earners and clerical workers, covering about 32 percent of the population. The CPI-W includes households where at least one-half of the income is earned from clerical or wage occupations. The CPI-U includes, in addition to clerical workers and wage earners, professional, managerial and technical workers, along with retirees and the unemployed. Persons living in rural areas, members of the armed forces and persons in institutions are not covered.

Table 1.

The New Consumer Profile

	Old	New
Household income, pre-tax	$12,332	$23,183
Per capita income, pre-tax	$ 4,044	$ 8,917
Number of people in household	2.8	2.6
Number of earners in household	1.3	1.4
Number of children in household	1.0	0.7
Age of head of household	47.3	46.2
Sex of head of household—male	75.9%	66.5%
—female	24.1%	33.5%
Percent reporting homeownership	55.8%	59.5%

The CPI is based on a sample of prices of all goods and services that people buy for day-to-day living. Changes are measured by pricing essentially the same market basket every month. This market basket has been revised to reflect current spending patterns. The total cost of that market basket during one period is compared with the total aggregate cost in a different period.

The need for a revision in the CPI's market basket can best be understood by comparing today's spending patterns with those of 15 years ago. Makeup of the "typical" family has changed markedly in this period. The two-earner family has become more common. This has led to shifts in spending preferences. For example, day-care expenditures have increased; less food is purchased at the grocery store, and more food is consumed away from home.

Similarly, the array of available products and services has changed along with tastes and preferences. Video cassette recorders and personal computers for the home did not exist 15 years ago, for example. Consumers have shifted their consumption patterns based on price changes over this period also. Less expensive poultry products have been substituted for a portion of the red meat in the family meal due, in part, to relative price changes. Furthermore, a smaller share of spending now goes for energy products, 7.4 percent compared to 8.9 percent. This includes spending on gasoline and home heating.

The largest shifts occurred in four of the components: food and beverages, housing, transportation and medical care. Furthermore, a significant shift away from spending for commodities toward expenditures on services occurred between the new and the old spending patterns.

Housing. The biggest shift was in housing costs, which now account for 42.9 percent of the index, up from 38.1 percent. For the first time, owner's use of their vacation property is included. This accounted for half of the increase. Several new items were added to the housing component, including home computers and smoke detectors.

Transportation. Transportation costs represent a smaller share of the revised CPI. Consumers are using less gasoline because of the increased use of more fuel-efficient cars. They are spending more overall on new cars, but less on used cars.

Food and beverages. Changing lifestyles were largely responsible for the diminished importance of this category. A major factor was a 7 percent decline in family size since the early 1970s. Combined with changes in food preferences, the food-at-home category fell from 12.9 percent to 10.1 percent. Restaurant meals maintained about the same share of the index.

Medical care. Although medical care costs remain a relatively small piece of the overall index (5.4 percent), rate of inflation in this component has been alarmingly high over the last decade. Despite increases in price, however, share of expenditures on medical care has actually fallen compared to 15 years ago, when it was 6.9 percent of total spending. This is largely explained by the growth of employer-provided health insurance. The CPI measures only price changes for out-of-pocket medical expenses of consumers.

The primary use of the CPIs is as a measure of inflation, at least for consumer spending. As such, it is often used to determine and evaluate government economic policy.

A second use is to adjust other economic statistics for price change and translate current-dollar amounts into inflation-free values.

A third use is to escalate income payments. More than three million workers . . . are covered by collective bargaining agreements which provide for increases in wage rates based on increases in the CPI.

In addition to private sector workers, the index affects the income of about 60 million persons receiving federal funds: 38 million Social Security recipients, over 13 million federal and military retirees, and about 19 million food stamp recipients. The official "poverty threshold" estimate, which determines eligibility for various health and welfare programs, is updated with the CPI.

It has been estimated that an additional 1 percent increase in the CPI in 1986 would have resulted in a $2.8 billion increase in federal spending. In addition, since 1985 the CPI-U has been used to adjust, or index, federal income tax brackets to prevent "bracket creep" (inflation-induced tax rate increases). Without indexing, it is estimated that each 1 percent rise in the CPI yielded additional tax revenues of $1.8 billion.

Updating of the CPIs to reflect more up-to-date consumer spending patterns should result in more accurate measures of inflation. Because movements in the CPI affect virtually everyone, the significance of better price statistics cannot be overstated.

John Hinrichs is staff economist, Southwestern Bell Corporation.

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TECHNOLOGY REVIEW

NEW CENTER WILL IMPROVE TECHNOLOGY FOR PROTECTING AIR AND WATER

Improved technology for controlling emissions from power plants burning high sulfur coal is the goal of the High Sulfur Test Center in Barker, New York.

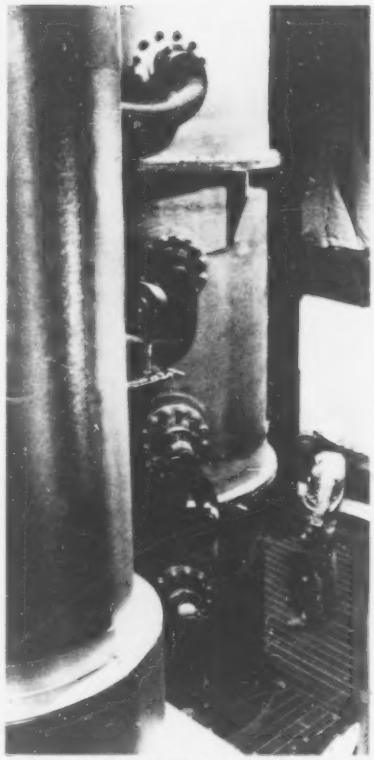
Electric utility industry executives, coal industry leaders, and state and federal government officials gathered there this September to launch their joint research efforts at the new Center, site of a 10-year $65-million test and development program now underway.

As the largest, most comprehensive research and development facility of its kind in the world, the High Sulfur Test Center (HSTC) will improve both the economics and the effectiveness of the next generation of emissions control technology. Work will focus on advanced systems for controlling compounds produced by burning high sulfur coal, an abundant energy resource in the eastern United States.

"The work underway at the HSTC will contribute to the clean coal effort, as well as to holding down costs for producing electricity," said Kurt Yeager, Vice President and Director of the Coal Combustion Systems Divison at the Electric Power Research Institute (EPRI), the organization managing the overall research and development effort.

Yeager stated that "With advances in technology, we can design more economical systems for cleanly generating electricity with our domestic, high sulfur coal."

Slated for development at the HSTC are advanced scrubber technologies for limiting emissions of sulfur dioxide (SO_2), a compound associated with the acid rain debate. A number of desulfurization processes, using either wet or dry materials to absorb the SO_2 before it can be discharged to the atmosphere, will be further developed at the HSTC.



A worker inspects the wet scrubber portion of the HSTC pilot plant.

One promising desulfurization process would produce gypsum in a special compact design. Gypsum is a valuable material that utilities could supply to the building industry. Another process, spray drying used for low sulfur coal, holds potential for reducing the cost of SO_2 removal for high sulfur coal as well. A third process, dry injection of alkaline powder, provides lower cost and more compact equipment for moderate SO_2 control on existing plants.

Also to be tested are advanced regenerative technologies. The first of which is the SOXAL™ process, developed by Allied Chemical Corporation, which would recover sulfur compounds from the flue gas for use in the chemical industry, virtually eliminating solid wastes and reducing costs for groundwater protection.

To facilitate these and many other tests, the HSTC includes an integrated array of wet scrubbing and spray drying equipment as well as particulate control hardware that can be used for development work on many different technologies. The flue gas comes from the adjacent Somerset Power Station, one of New York's largest and cleanest coal plants.

The HSTC is a joint project of EPRI, the New York State Electric & Gas Corporation, the Empire State Electric Energy Research Corporation, the New York State Energy Research and Development Authority, Consolidation Coal Company, and the U.S. Department of Energy (contract pending). Additional co-sponsors are expected, including international participants.

PROCESSING COAL WITH BIOTECHNOLOGY

Researchers are growing bacteria and fungi to find new ways of turning coal into a better energy source. The genetically engineered bugs are being harnessed to transform coal into useful forms of liquid or gas and to remove pollution-causing sulfur from the coal.

The implications are potentially immense for a world with dwindling oil reserves, an insatiable appetite for liquid fuels and centuries of coal supplies still available.

"It is clear to me that we are entering the biologic age," says Dwain Spencer, EPRI's Vice President for Advanced Power Systems. "Although many questions remain, the exciting progress that has been made in a few short years convinces me that biologic processing systems

for coal will be an important element in the electric utility industry's future."

Experiments in the early eighties turned up the surprising fact that a common wood rot fungus can transform lignite into a liquid. Building on this discovery, EPRI researchers last year isolated a key enzyme produced by the fungus that dramatically speeds up reaction times. Researchers are now looking at using the enzyme to liquefy coal underground, then pumping the converted fuel to the surface like oil.

In similar work, Houston Lighting & Power Company is exploring the use of methane-producing bacteria to gasify lignite. The utility is considering using caverns carved out of salt domes as reaction chambers for producing the biogas, which would then be used to run combustion turbines. Scientists are searching the bottom sediments of the Dead Sea and Utah's Great Salt Lake to find salt-tolerant bacteria that will eat lignite and excrete methane.

Not everyone wants to turn coal into a gas or liquid. With air quality of international concern, many researchers are trying to find ways to remove sulfur from coal before it is burned. In fact, sulfur removal may turn out to be the first commercial application of coal bioprocessing.

Although conventional coal-cleaning methods remove some of the pyritic sulfur particles that exist in coal as distinct veins or nodules, they do not remove the organic sulfur that is bound chemically into the coal molecules. More than half of the sulfur in some coals is in organic forms.

Researchers have found that pretreatment in bacterial broth changes the surface properties of ground coal, doubling the pyritic sulfur removal achieved through conventional cleaning. In addition, they have produced a genetically altered bug that removes organic sulfur by breaking the chemical bonds in the coal structure.

Despite such significant research advances in the last five years, many technical and economic questions remain unanswered. But researchers are confident that with luck and hard work they can make coal bioprocessing a viable alternative in the next decade.

According to Spencer, "EPRI has a serious commitment to the development of a biologic processing capability that will give the industry far greater flexibility in its search for clean, economic ways of using coal. EP

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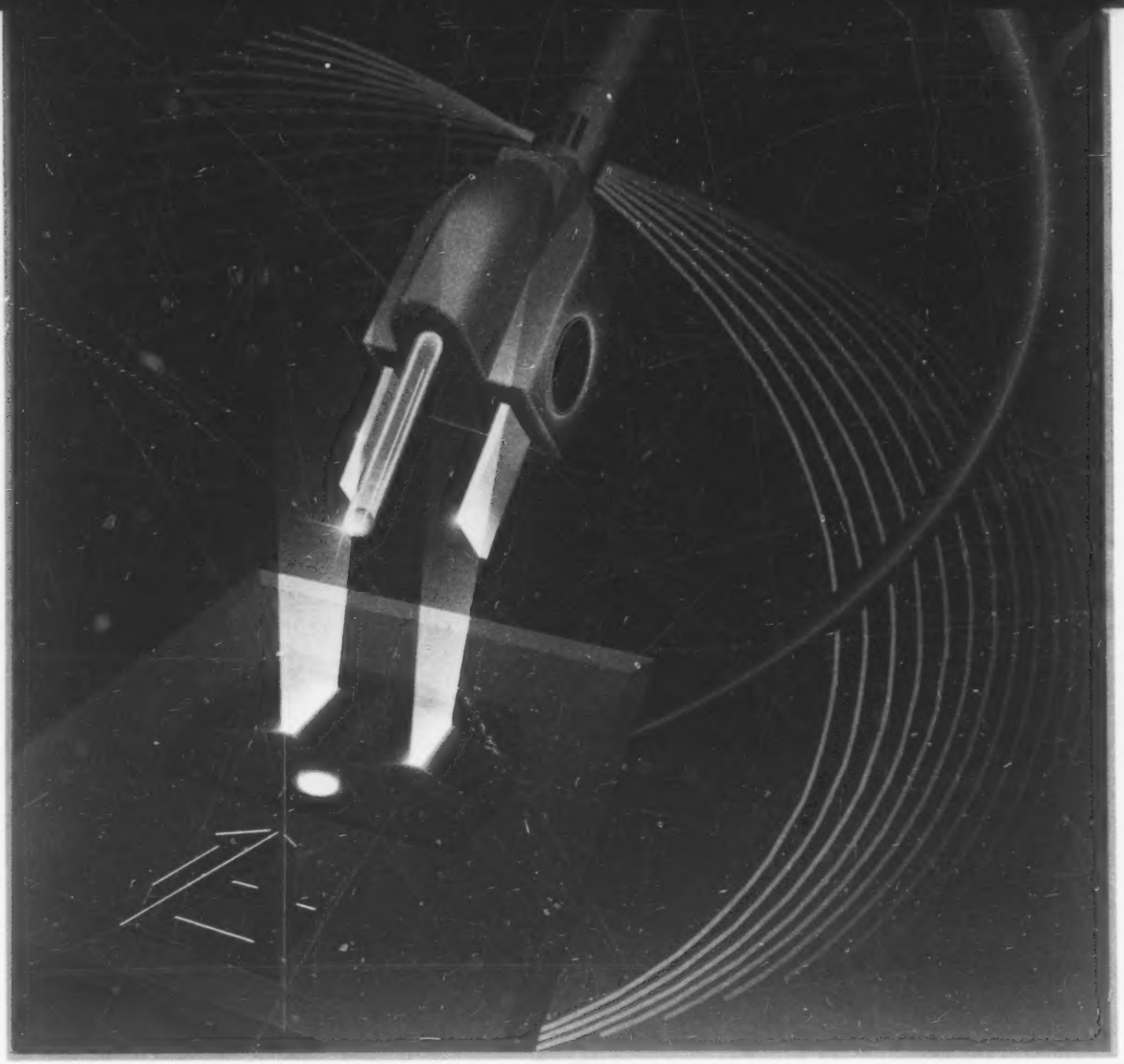

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ELECTRIC PERSPECTIVES

Henry W. Pirkey Power Plant

Custom design on a fast track

Tomorrow's power plant will need to be brought on line quickly. The Henry W. Pirkey plant is an excellent example of a new unit completed on an accelerated schedule within a carefully controlled budget.

This 640-MW mine-mouth lignite-fired station in Harrison County, Texas is owned by Southwestern Electric Power Company, Northeast Texas Electric Cooperative, Inc., and Oklahoma Municipal Power Authority. It's a custom design that incorporates the arrangement and operating features desired by the owners and the engineering expertise of Sargent & Lundy.

At authorization, the project schedule allotted 27 months for design and engineering, 6 months for contractor bidding, and 43 months for construction. The project met each schedule milestone and was completed on time and within budget, without sacrificing quality.

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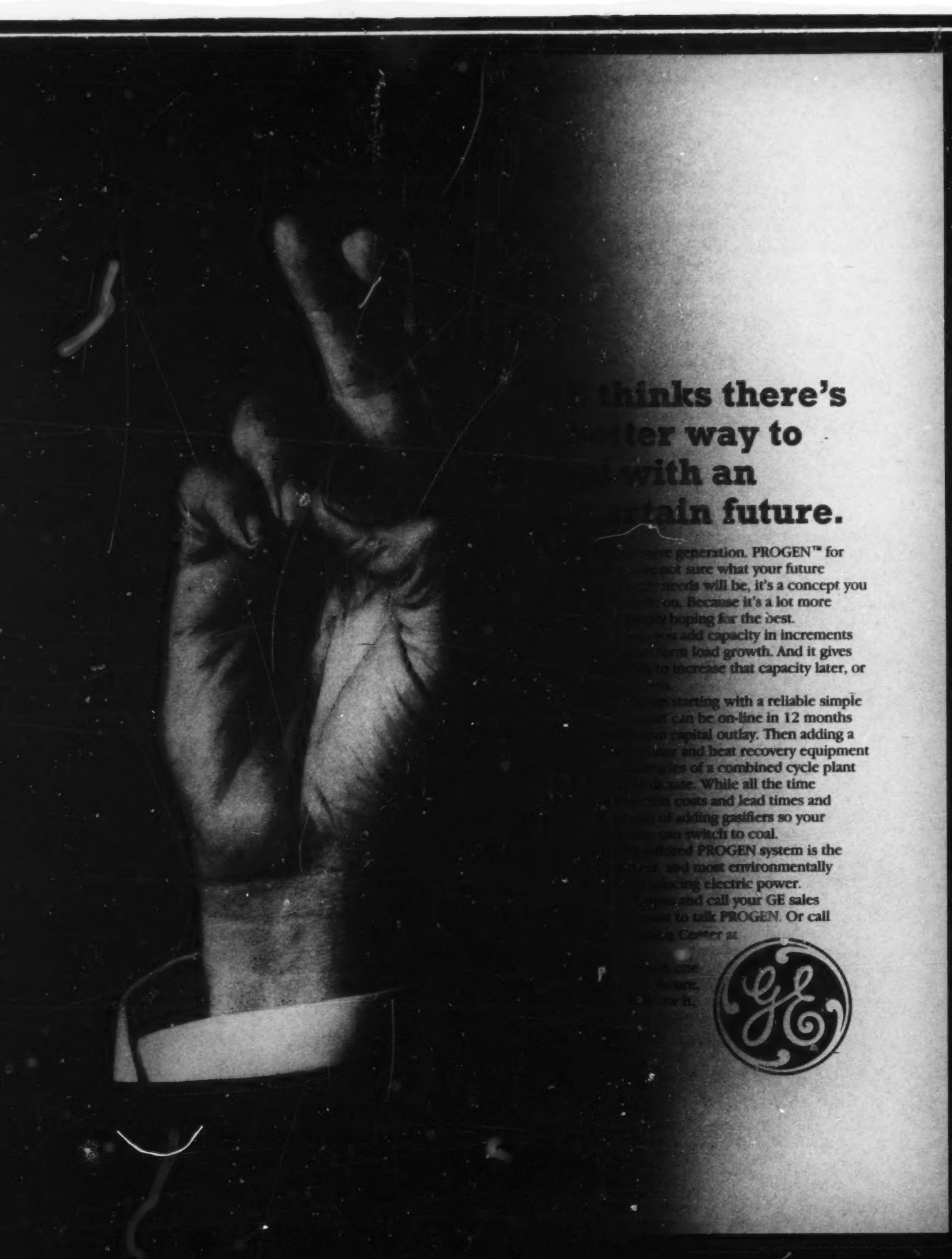

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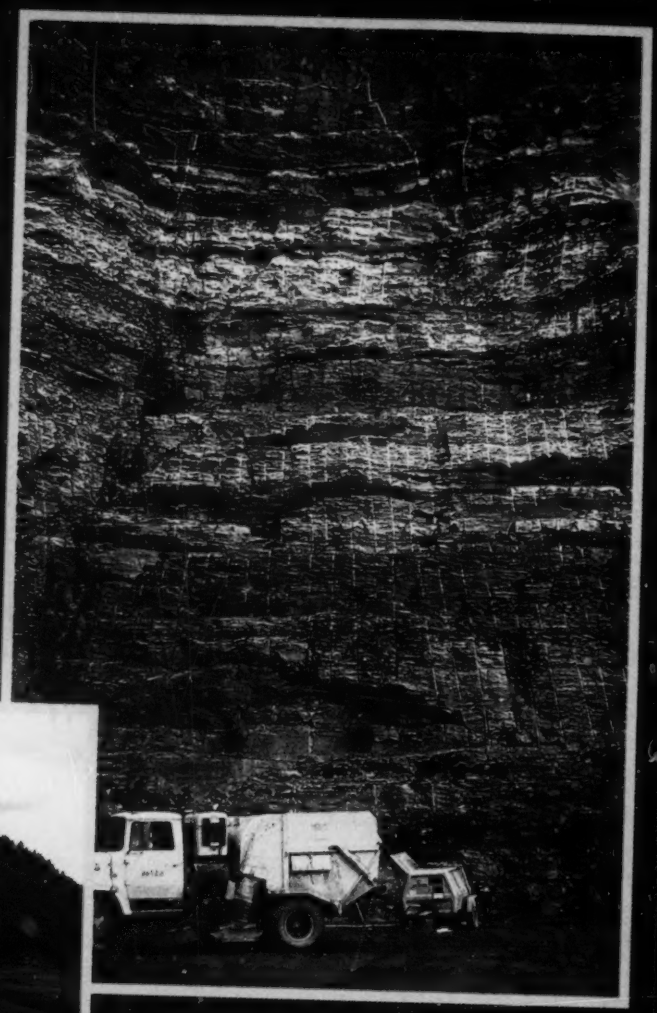

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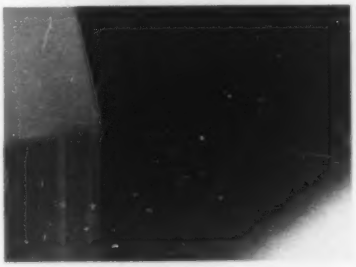

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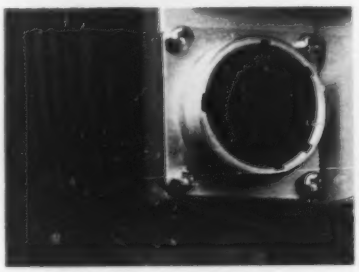

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Cover: How do residential customers think about controlling their electricity costs? See page 8. Photo by Mike Mitchell/Folio Inc.

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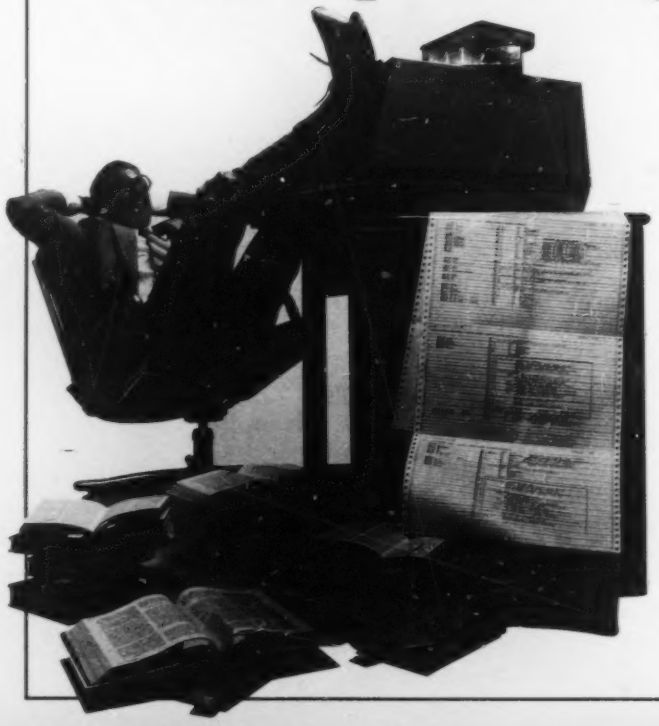

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Selling Electricity Can Earn Customer Satisfaction

Through careful market segmentation and targeted marketing, you can help your customers control their costs AND improve your company's bottom line at the same time.

Electric utilities' customers are no longer—if they ever were—a monolithic market with one set of needs and preferences. Different customer segments want to buy electricity in new ways that uniquely fit their needs and lifestyles. While they don't expect as many choices when buying electricity as they encounter when buying other consumer goods and services, they do want options along basic product dimensions like quality of service, time of purchase, and pricing.

In addition, customers increasingly see their electric company not just as a producer of a single commodity, electricity, but as a service institution. As a result, they want more personal attention and specialized customer service from their utility. They want and expect better performance in traditional service areas, and they want new programs and activities that demonstrate the electric company's commitment to their well-being, its concern and caring for them.

Customer segmentation research done for the Edison Electric Institute (EEI) in 1985 and 1986 found that one of the most productive and convincing ways an electric company can prove it is both a superior product and service institution is by helping customers better control their electricity usage and bills. The segmentation studies showed that customers themselves want more control and choice over their use of electricity and that they want their utility to provide them with programs and options to help them achieve that control. (The sidebar on page 12 highlights the objectives and major findings of those studies. For a detailed description of them, see "Why You Need Satisfied Customers," EP, Summer 1986, pp. 20–27, and "How To Earn Customer Satisfaction," EP, Fall 1986, pp. 29–39.)

To understand how residential customers think about and define "cost control," Edison Electric Institute commissioned Cambridge Reports to undertake a third customer research study in 1987. Through 2000 conversations with individual residential customers selected to represent the entire adult U.S. population, we identified which customer segments currently participate in, or are likely to take, various cost-control measures. The interviewing for this Residential Customer Cost-Control Segmentation Study was done from May 15 to May 27, 1987; the analysis was completed this past fall.

From the data, clear patterns emerged which show that by marketing their products and services in a way that addresses customers' desire for cost control, electric companies can not only earn overall customer satisfaction and loyalty but also improve their profitability at the same time. Meeting customers' self-felt desires for greater personal control and choice over their electric usage and the size of their bills is at the heart of a company positioning strategy—an approach or "umbrella" under which specific electricity sales activities should be organized. Virtually all utilities can use this cost-control company positioning strategy to help achieve their own unique sales and load-shaping goals.

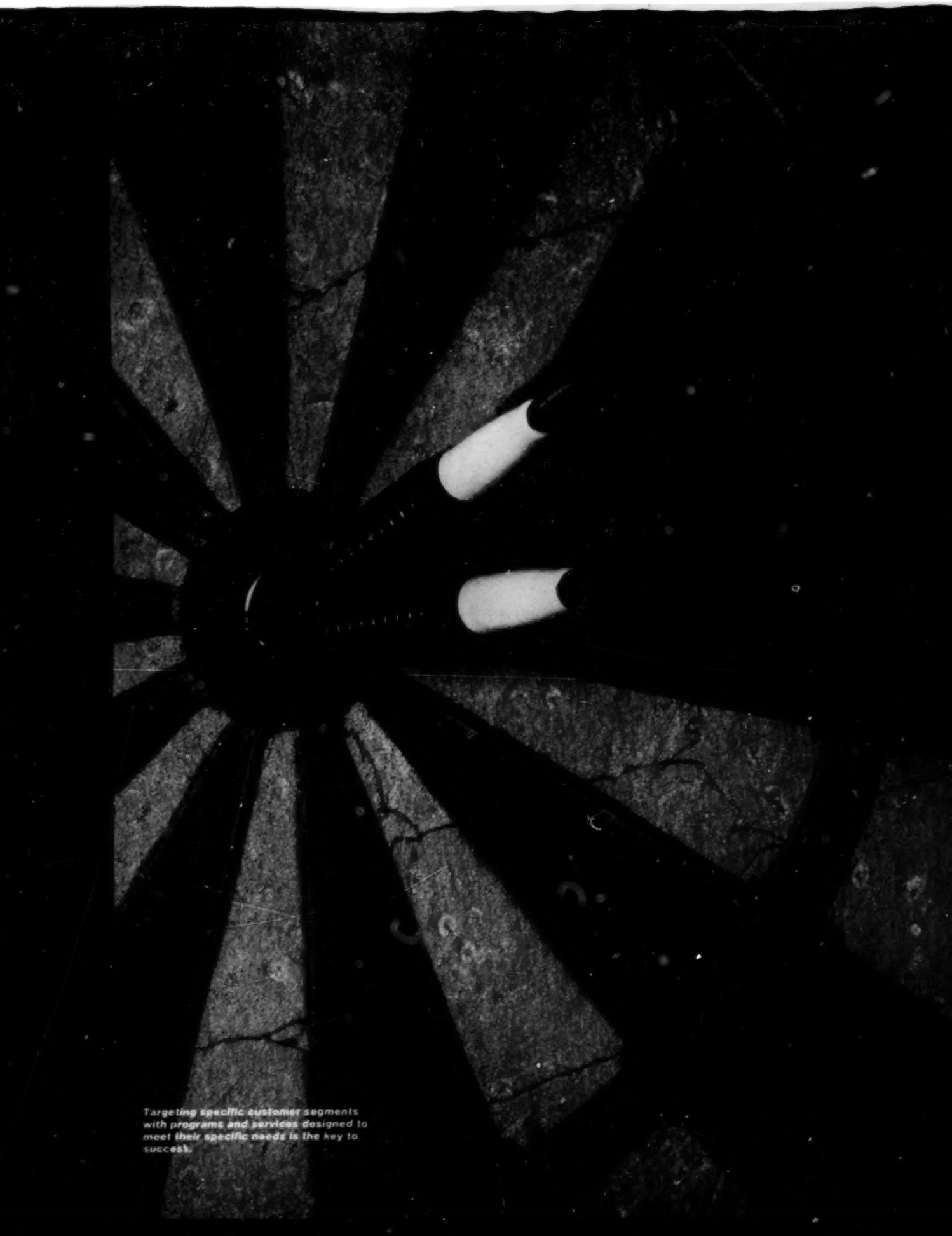
Gene Pokorny and James Murphy are principals of Cambridge Reports, Inc., in Cambridge, Massachusetts.

How Customers Think About Cost Control

To uncover how residential customers think about cost control and evaluate activities that can help them get better control over their electricity usage, we asked all respondents in our national survey two sets of questions, the first about the importance of cost control and the second about the likelihood of their taking cost-control measures.

In the first set, we asked respondents to rate the importance to them of 20 cost-control actions they could take. After analyzing these ratings, we found that most of them are strongly correlated with one of three underlying dimensions: low-investment/involvement cost-control activities, high-investment/involvement cost-control activities, and hard intervention cost-control activities. Table 1 presents some key cost-control actions that make up these dimensions.

The actions listed under the first dimension or factor share the char-



Targeting specific customer segments with programs and services designed to meet their specific needs is the key to success.

acteristic of being relatively low-investment approaches to cost control. They are also low-involvement approaches in the sense that changing lights, installing fans, or buying efficient appliances are one-time actions that make possible continued automatic savings. Similarly, participation in a bill-leveling program does not explicitly require any change in the customer's use of electricity.

By contrast, the cost-control actions listed under the second dimension may be thought of as relatively high-investment, as well as high-involvement, approaches—time-controlled thermostats must be individually programmed, a home energy audit usually implies a willingness to undertake improvements that may require both time and money, etc.

As distinct from the other two, the third dimension is composed of cost-control actions that save money if customers alter more significantly the way they use electricity. All these measures, to varying degrees, disrupt the way most customers currently use electricity and imply varying degrees of control by the company over that use.

The overwhelming majority of customers considers all three types of cost-control actions highly or moderately important, as indicated in Table 2. Demographic analysis of these customer segments shows that the following groups rate all three types of cost-control activities as moderately or highly important: those with a favorable image of their electric company, residents of two- or three-family homes, and those with larger households and electric bills. The tendency to attribute low importance to all three types of activities grows with increasing age and length of residency and is higher among residents of single-family homes.

In addition to the broad patterns, individual demographic differences distinguish the respondents most likely to attach high importance to each type of cost-control activity. Customers with moderate family incomes and lower levels of education are more likely than others to rate low-investment/involvement cost-control activities as important, while better-educated, higher-income customers are more likely to rate high-investment/involvement measures as important. Customers with incomes below $15,000 are more likely than others to rate hard intervention cost-control measures as important.

Table 1

Actions Behind the Three Underlying Dimensions

Low-investment/involvement cost-control activities
Purchase energy-efficient major home appliances
Participate in level-bill payment program
Purchase energy efficient lighting equipment and bulbs
Participate in energy-efficient appliance rebate program
Install ceiling or whole-house fans
High-investment/involvement cost-control activities
Participate in a home energy audit program
Install high-efficiency electric heat pump at replacement
Install set-back thermostat for heating/cooling system
Replace heating/cooling system with more efficient one
Hard intervention cost-control activities
Participate in year-round time-of-day rates
Install a company-controlled appliance-cycling device
Participate in seasonal time-of-day rates
Participate in demand subscription rates

Likelihood of Engaging in Cost Control

In the second set of questions in our national survey, we asked respondents if they had adopted each of 23 cost-control measures or how likely they would be to do so. Actual rates of participation range from a high of 71 percent for weatherstripping and replacing doors and windows to a low of 3 percent for participating in an appliance-cycling program. Table 3 presents the participation rates for the 23 cost-control measures we tested.

Since a major constraint on cost-control measures customers can adopt is the combination of heating and cooling equipment in their homes, we identified the key customer segments based on these combinations and participation

Table 2

Customer Segments Based on Importance Ratings of the Three Underlying Cost-Control Dimensions

	Customer segments		
	Low importance	Moderate importance	High importance
Low-investment/involvement cost-control activities	27%	21%	52%
High-investment/involvement cost-control activities	29%	23%	48%
Hard intervention cost-control activities	38%	21%	40%

Table 3

Participation Rates for Cost-Control Measures

Measure	Rate
Weatherstripped/replaced doors and windows	71%
Lowered/raised heating/cooling thermostat	70%
Lowered water-heater thermostat	65%
Added insulation	55%
Installed ceiling fans	50%
Installed energy-efficient lighting	44%
Purchased energy-efficient appliances	41%
Installed energy-efficient heating/cooling	23%
Installed time-controlled thermostats	19%
Had a home energy audit	18%
Installed separate thermostats	14%
Visited an energy-efficient model home	12%
Participated in level-bill program	11%
Installed an electric heat pump	10%
Visited a bill-counseling office	6%
Received energy-efficient appliance rebates	5%
Participated in demand subscription program	4%
Participated in seasonal time-of-day rates	4%
Installed an appliance-interlock device	4%
Received energy-efficient appliance loans	3%
Participated in year-round time-of-day rates	3%
Installed appliance-cycling device	3%

rates these segments have for the 23 measures. Five combinations of home heating and cooling equipment account for 66 percent of all residential customers in the country, as shown in Table 4.

While the participation rates of customers in these five segments generally exceed those of residential customers as a whole, there are some interesting differences among the segments. Customers with electric heat pumps, perhaps because they live in newer homes, are less likely to have weatherized, though more likely to have energy-efficient lighting and ceiling fans. In contrast, customers heating with fuel oil or electric furnaces, customers who may have experienced rising heating costs in the last decade, are more likely to have weatherized their homes.

Customers who heat with oil and those with central air conditioning who heat with either gas or a heat pump are most likely to have adjusted their thermostats and to have replaced existing equipment with energy-efficient heating or cooling systems. Those with natural gas heat and central air conditioning are the most likely to have had an energy audit or installed time-controlled or set-back thermostats. Those who heat with oil are least likely to have adjusted their hot water thermostats—perhaps because of furnaces with tankless hot water systems. Finally, the few customers who have electric furnaces and central air conditioning are most likely to have participated in some of the measures—installed appliance-cycling or continuous usage display devices—that have the lowest overall participation rates.

After analyzing these ratings of current and possible future participation through factor analysis, we found that customers again think of

A variety of factors—from age and income to payback periods and household size—affects customers' willingness to invest in their home's energy efficiency.

Charles Gupton/Unphoto

Everett C. Johnson/Folio Inc.

cost control in basically three underlying dimensions, nearly identical to those based on the importance ratings: low-investment/involvement cost control, high-investment/involvement cost control, and incentive rate cost control.

As before, on each of these dimensions we divided residential customers into groups or segments based on their responses. As was the case with the earlier customer segments based on importance ratings, customers are clearly more likely to adopt low-investment/involvement measures. Least likely to be adopted are incentive rate measures. Table 5 presents these segments on each dimension.

Customers who are homeowners, residents of single- to three-family houses, those who have lived in their current house five to ten years, those with larger households and electric bills, and those with moderate incomes are most likely to say they will adopt low-investment/involvement cost-control measures. Customers similar to this group but who have lived in their homes ten years or more and have larger incomes—up to $50,000—are more likely to say they will adopt high-investment/involvement cost-control measures. Finally, customers most likely to participate in incentive rate cost-control measures or programs are similar to these groups but more likely to be renters or residents of apartments or condominiums.

As a final way of determining which customers overall tend to be most likely to engage in cost-control activities, actual participation in and propensity to adopt the 23

EDISON ELECTRIC INSTITUTE'S PREVIOUS CUSTOMER SEGMENTATION STUDIES

The Residential Customer Market Segmentation Study—1985

The Objective

Uncover residential customer attitudes about electricity and electric companies.

Findings

Customers think about their electric company along both a *product* and *service* ("a concern and caring") dimension.

Customers' views about their electric company's product and service performance equally explain broad judgments they make on issues like overall company favorability, fairness of rates, and ability to control energy usage and bills.

Customers trade off positive evaluations in the service, or concern and caring, area with negative perceptions in the product area, especially price perceptions.

The Residential Customer Program Segmentation Study—1986

The Objective

Identify which electric company programs and activities best demonstrate to various customer segments a commitment to superior customer service.

Findings

Customers think about an electric company's service performance along six to eight key dimensions.

Customers rate traditional "reliability of service" programs and activities as the single most important way an electric company can prove its overall customer service commitment.

Customers rate second most highly as a demonstration of superior customer service any electric company programs and activities that help them gain more control over electricity usage and bills.

Various, more targeted customer segments also rate higher other specific kinds of company programs and activities.

measures were combined into an additive index of cost-control activity. Demographic analysis of this additive index shows that customers most likely to have adopted or to be prone to adopt cost-control measures are: homeowners who have lived in their current residence between five and twenty years, those more likely to remodel than move, middle-aged customers with moderate levels of education, and customers with larger households, electric bills, and family incomes.

Table 4

Residential Heating and Cooling Equipment Combinations

Heating Equipment	Cooling Equipment	Percentage of Customers
Natural gas	Room AC	34.9
Natural gas	Central AC	15.7
Fuel oil	Room AC	8.2
Electric heat pump	Central AC	4.3
Electric furnace	Central AC	2.9

Table 5

Customer Segments Based on Propensity Ratings of the Three Underlying Cost-Control Dimensions

	Customer segments	
	High propensity to engage	Low propensity to engage
Low-investment/involvement cost-control measures	73%	27%
High-investment/involvement cost-control measures	68%	32%
Incentive rate cost-control measures	44%	56%

Table 6

Percentages of Customers Willing to Pay $500 or $1000 for Energy Efficiency Improvements by Payback Periods

Payback period	Very willing $500	Very willing $1000	Not at all willing $500	Not at all willing $1000
Five years	23	20	23	20
Three years	30	33	18	18
Two years	49	47	16	17

Effects of Payback Periods

Customers in our survey were given an explanation of *payback period*—the time it would take to recoup the expense of an investment in their home's energy efficiency. Customers were asked two series of questions to determine how willing they would be to pay either $500 or $1000 for energy-efficiency improvements with payback periods of five, three, or two years. Table 6 shows the answers to these questions.

The difference between the two levels of expenditure required—$500 and $1000—has far less effect on customers' willingness to make such an investment than does the length of the payback period. Only one of every five customers is very willing to make either investment with a payback period of five years. This rises to three in ten with a payback period of three years and to almost five in ten with a payback period of two years. At the same time, roughly one in five customers refuses to spend either amount on improving home energy-efficiency, regardless of the payback period.

Demographic analysis shows that customers most willing to make investments include residents of two- to three-family homes, shorter term residents, customers who are likely to remodel or move, and those with larger households, larger family incomes, and larger electric bills. Willingness to invest in energy efficiency increases with education and age—up to age 45. Customers 56 years and older are less willing to make such investments. Men are more likely than women to make energy-efficiency investments.

Locating Market Segments

Identifying target market segments for various electricity applications and sales that meet customers' cost-

control needs is only the first step in establishing successful sales campaigns and activities. Once market segments are identified, another problem usually arises—how to locate the desired market segments geographically so that they can be contacted by the electric company in as direct and cost-effective manner as possible.

In our national study we illustrated a relatively new approach to this problem—geodemographic cluster analysis. This kind of analysis goes beyond traditional market segmentation on the basis of customers' demographic differences to locate potential customers in terms of their geographic cluster location—that is, where they actually live. Common to all geodemographic targeting systems is the knowledge that people with similar demographic characteristics tend to live in the same neighborhoods. Typically, residents of these relatively homogeneous neighborhoods share lifestyles, interests, and behaviors that distinguish them from residents of other neighborhoods. These similarities affect such things as their purchase and consumption of goods and services, including electricity.

A number of geodemographic targeting systems have been developed by different companies using proprietary methods. Generally, however, these systems have given every residential area in the United States a particular cluster code assignment. All based on U.S. census data, the systems are developed, in most cases, through a series of correlation and factor analyses. While the number of clusters vary by company, they range from about 40 to 47 and are used to characterize all neighborhoods, and thus households, in the country.

The geographic areas used to

Table 7

Donnelley ClusterPlus Multifactor Cluster Groups

Group code	Description	Percentage nationally	Percentage of respondents in this study
G01	Well educated, affluent, suburban professionals	8.1	6.0
G02	Urban, mobile, professional, few children	5.8	6.4
G03	Above-average income, homeowners, families with children	9.6	9.8
G04	Above-average income, older, white-collar workers, few children, old homes	6.6	5.8
G05	Younger, mobile, above-average income, families with children, new homes	9.5	8.9
G06	Younger, mobile, below-average income, singles, few children	12.0	11.6
G07	Average income, blue-collar families, rural areas	14.2	14.3
G08	Below-average income, older, few children	14.2	19.0
G09	Less educated, downscale, rural families with children	11.1	11.8
G10	Downscale, ethnic, urban apartment area, old housing	9.0	6.5

Robert Rathe/Photo Inc.

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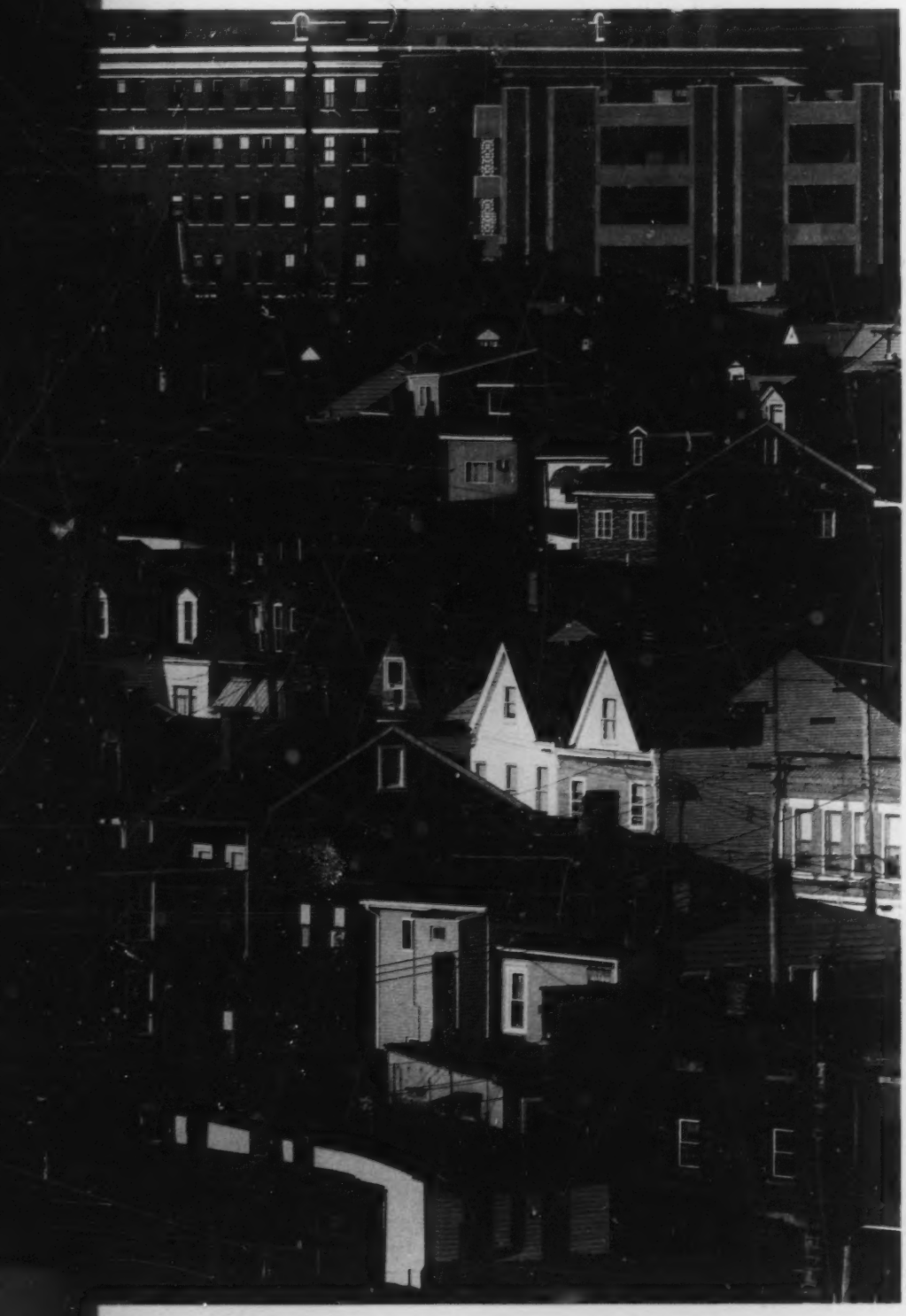
Bob Daemmrich/Unisphoto

The type of neighborhood a customer lives in can tell an electric company a lot about that customer's propensity to engage in hard intervention cost-control activities like participating in time-of-use rate programs.

form the neighborhood clusters may include block groups and enumeration districts, census tracts, or zip codes. Block groups and enumeration districts are the smallest geographic areas—about 350 households—that the Census Bureau releases meaningful information on. Zip codes are designed by the Postal Service and contain about 3,500 households. Each geographic area will be assigned the cluster code that best characterizes that area.

Knowing only the street address of a given household, marketers can use a geodemographic targeting system to assign it the discrete cluster code used to characterize its neighborhood. To the extent that a particular household is typical of the other households in its neighborhood, the cluster code thus assigned will tell marketers much about its demographic characteristics. If past experience or market research shows that such households are good prospects for a particular product or service—such as a specific cost-control activity—a mailing list of all "look-alike" households in a given area—like a utility service territory—can be purchased from a mailing list supplier.

For our national EEI study, we used the Donnelley Marketing Information Services ClusterPlus geodemographic targeting system. This particular system can be used to assign households to one of forty-seven cluster segments (S01 to S47) based on the cluster code assigned to its census block group/enumeration district, census tract, or postal zip code area. Each of these clusters represents a unique demographic profile of a neighborhood or specific geography. For example, households classified S05 are de-



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Geodemographic cluster analysis can help utility marketers characterize neighborhoods and define their boundaries.

scribed as high income, high home values, well educated, professionally employed, low mobility homeowners, homes built in the 1950s and 1960s. Nationally, 2.5 percent of all households are designated S05, though the percentage of such households in any specific part of the country may be higher or lower. These 47 clusters can, in turn, be grouped into ten multifactor clusters on the basis of similar demographic characteristics. Table 7 presents a description of these ten multifactor groups.

Geodemographic cluster analysis can be used in a variety of ways to identify where specific kinds of market or customer segments live. One way—the inductive approach—is based on a simple but powerful observation: all things being equal, the best prospective new customers for a product or service are look-alikes to existing customers. Based on this observation, a profile of likely prospects can be developed by examining current customer files or by surveying current customers to identify their demographic, attitudinal, and behavioral characteristics. This inductive approach has the advantage of describing new market prospects based directly on prior customers' attitudes, values, and behaviors rather than indirectly on prospective customers' intentions.

An example of the inductive approach from our national survey shows that customers in the Donnelley multifactor cluster group G03—upscale homeowners with children—are significantly more likely than those of the other nine groups to have already replaced existing lighting with energy-efficient lighting. Thus, if an electric com-

pany wants to sell more energy-efficient lighting, sales efforts and promotions to G03 customers would probably produce results more cost effectively than broader sales campaigns addressed to all customers.

Another way of using geodemographic cluster analysis is the deductive approach. It is appropriate where too few or no current customers exist who can be analyzed to identify the look-alikes. This is exactly the situation many electric companies face as they try to sell electricity in new ways.

An example of this deductive approach based on our national survey data shows that while only 3 percent of the customers have participated in an appliance-cycling device program, one-quarter (25.4 percent) say they would be at least somewhat likely to do so. Comparing actual to expected percentages of customers who say this for each of the ten Donnelley multifactor cluster groups shows that G10 customers—downscale, ethnic, urban apartment residents—are the group most likely (1.25:1) to participate in such a program. When we select only those customers with major appliances suitable for cycling, however, the potential market segment shrinks to 14.9 percent of all customers, with G09 customers—downscale families with children—emerging as the most likely (1.64:1) prospects within this reduced segment. Further selecting only customers who score high on the additive index of cost-control activity, we find the deductively derived potential market segment shrinks to 10.5 percent of all customers, while G09 customers still remain the best prospects. Hence, sales activities to neighborhoods with high concentrations of G09 customers should be considered by companies wanting to market these kind of devices.

Targeted Marketing to Specific Cost-Control Market Segments

Careful market segmentation and targeted marketing are the keys to selling electricity successfully through a cost-control company positioning strategy to residential customers. An electric company must identify a limited number of target markets for the electricity sales and applications it wants to promote that also optimally serve its customers' preexistent cost-control needs and preferences.

In our national study two types of relationships between the variables used in the analysis and customers' willingness to adopt cost-control measures that use electricity in various ways have been uncovered. In many cases, the higher customers are on a variable, the greater is their interest in cost control generally and in specific ways of using electricity. This is true, for example, of the individual variables of household size, size of electric bill, likelihood to remodel, and score on our additive index of cost-control activity. The relationship of such positive linear predictors to the propensity of customers to adopt cost-control measures—in effect, the potential of market segments defined by their scores on such variables—is depicted in the first chart on Figure 1.

In contrast to these positive linear predictors, there are other variables that show a more complex relationship to customers' interest in cost-control activities, as illustrated by the second and third charts on Figure 1. While there are individual variations, the general shape of the curve representing the

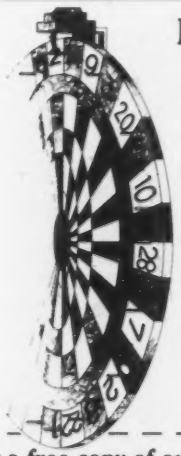

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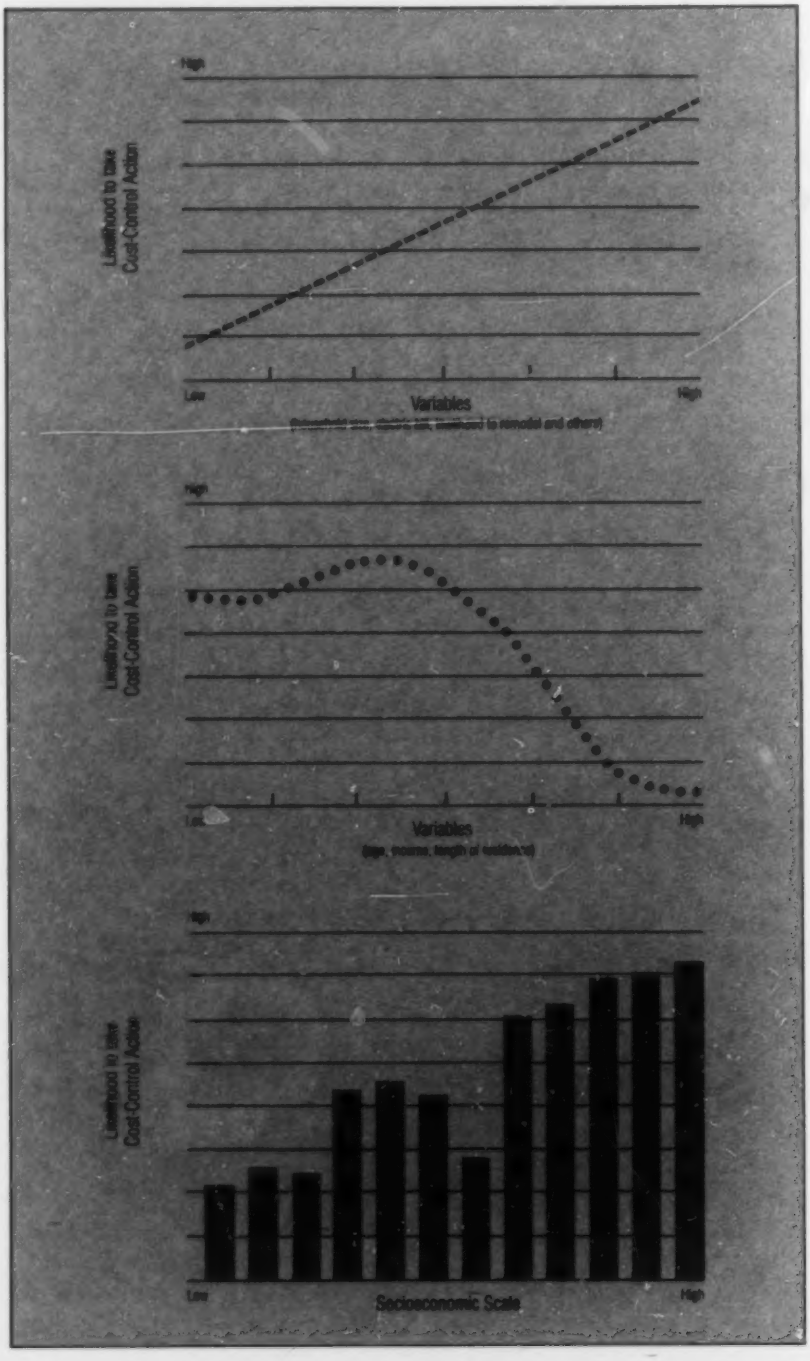
Figure 1

Customer Characteristics vs. Interest in Cost Control



relationships among such variables and the market potential for cost control is depicted in the second chart. For variables such as a customer's age, family income, or length of residence, propensity to adopt cost-control measures begins at a moderate level, rises to its highest point somewhere in the middle range of the variable, and then declines rather sharply toward the high end of the variable.

Specifically, up to a point, the older and wealthier customers are and the longer they have lived (and are likely to remain) in their current residence, the more interested they are in cost-control activities. However, after a certain age or length of residence and above a certain income level, interest in these ways of using electricity markedly declines. Conversely, while interest at the lower end of such variables may be relatively high, younger, more mobile, lower-income customers may lack both the resources and the commitment to a particular residence to actually engage in many cost-controlling uses of electricity. In between the point at which customers may have high interest but fewer resources and the point—later in their lives—when they may have higher resources but less interest, there is a period that may be characterized as a "window of opportunity" for the successful marketing of new cost-control applications of electricity to such customers.

Insofar as this window of opportunity for marketing new electricity sales is defined by such things as a customer's age, resources, and housing stock, it is clearly linked to demographic characteristics, which vary at different stages in typical customer life cycles. Willingness and ability to buy electricity in new ways and adopt certain types of cost-control measures—such as re-

placing an existing heating or cooling system or installing an electric heat pump—are not related in a simple, positive, linear fashion to socioeconomic status. While it is generally true that upscale customers are more likely than others to adopt these measures, geodemographic cluster analysis of customer files or survey results reveals unanticipated market niches for such new sales at points further down the socioeconomic scale. For example, moderate income, empty nesters living in older houses may have both the income and need to adopt such measures. The third chart on Figure 1 illustrates how such market niches might be arrayed along an index of socioeconomic status such as those upon which the various geodemographic clustering schemes are based.

While the discovery of these market niches for different electricity sales linked to life cycle demographics is complex, the moral of this finding is simple. No single variable is a completely reliable predictor of customers' interest in cost control in general, much less of their willingness and ability to adopt specific measures and buy electricity in new ways. Rather, it is the intersection of several factors—such as length of residence, intentions to move or remodel, income, and existing heating and cooling equipment—that explains customers' interest in and likelihood of using electricity in new ways that provide better cost control and choice.

The key to selling electricity cost effectively is the use of a cost-control company positioning strategy implemented through careful market segmentation and targeted marketing. The challenge is to find the set of variables and geodemographic clusters that—relative to a particular electric company's unique marketing and load-shaping objectives—define and locate the specific customer segments or target markets that need and want new ways of using electricity that meet their desires for greater choice and cost control over their use of electricity.

Thank you again!

All of us at Cambridge Reports are again delighted that you, through Edison Electric Institute, selected us to conduct the "Residential Customer Cost Control Segmentation Study."

Building on the findings of the 1985 and 1986 segmentation studies we did for EEI, this recent study is the basis of the article "Selling Electricity *Can* Earn Customer Satisfaction" in this issue of *Electric Perspectives*.

If there is one thing we've learned in our 14 years of research experience—including more than 700 studies for over 100 utilities in areas like customer service evaluation, marketing, demand-side management, communications, and supply-side planning and forecasting—it is that customer attitudes and expectations are constantly changing.

Well-designed customer research like EEI's continues to be the surest route to understanding these changes, meeting the marketing challenges they present, and ultimately profiting from them.

We are proud and grateful to be part of this research effort.

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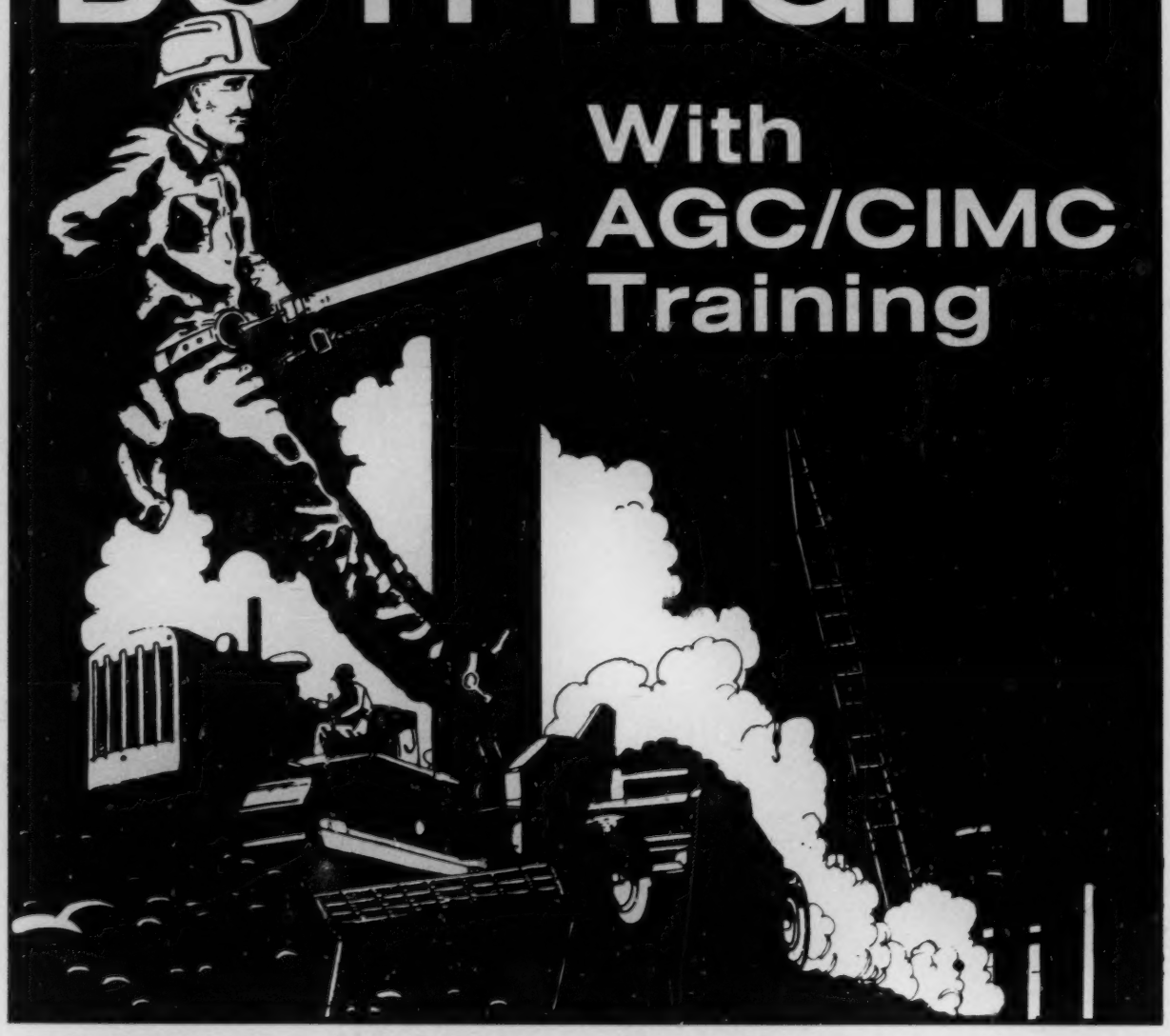

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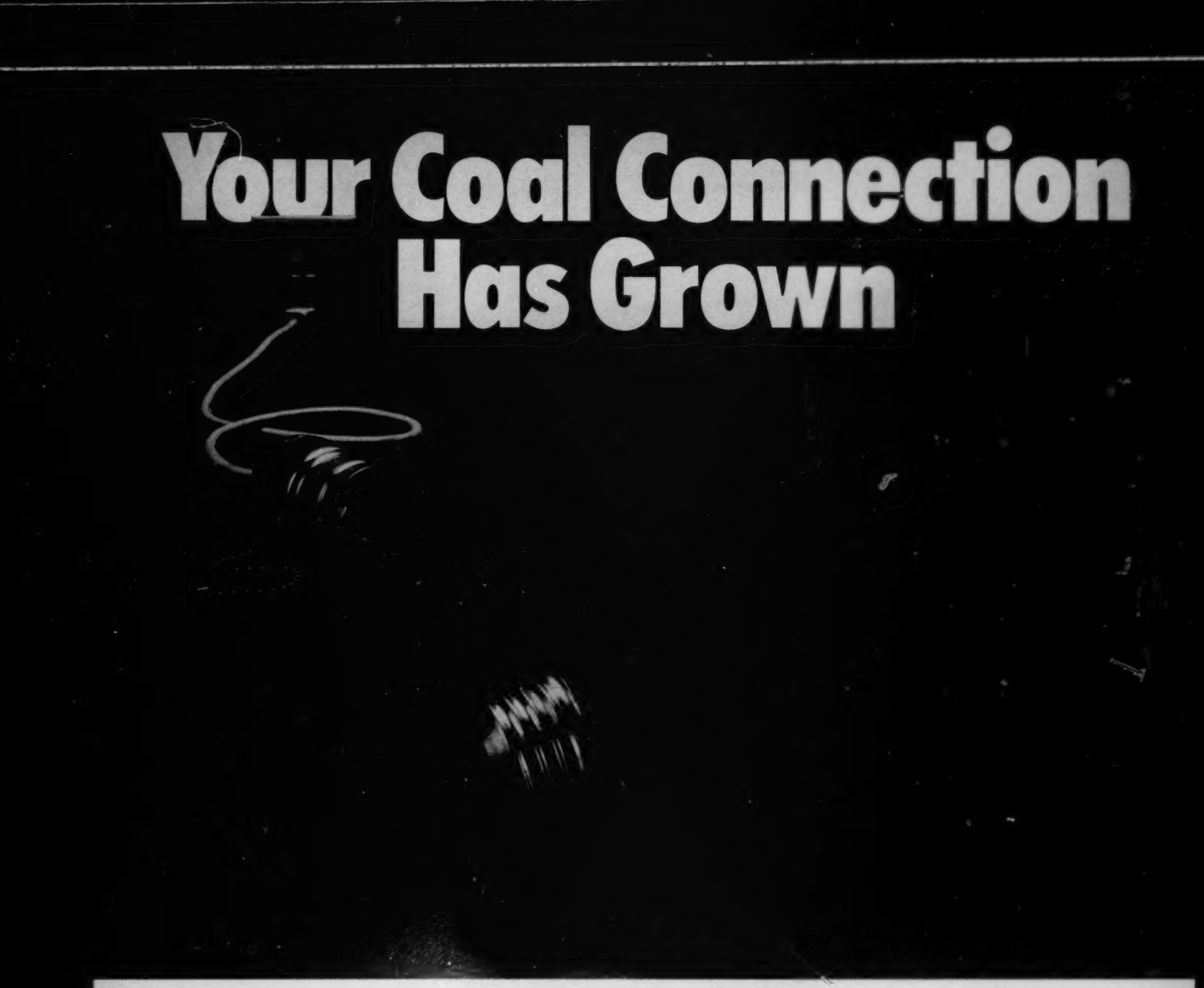

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A New Definition of Marketing

The marketing function is essential in an environment of change.

As recently as 20 years ago, a utility's only real marketing impetus—and I use the word *marketing* loosely here—came from the supply side. In fact, traditional utility marketing was dominated by one simple question: how much electricity can we sell?

This approach developed within what I call traditional utility boundaries, as depicted in Figure 1. Utilities concentrated on the central station supply of capacity and energy and on the delivery of that supply to the customer's meter. And that's it—what went on outside these boundaries received some attention, but only when necessary to explain variances in sales and load forecasts.

The limitations inherent in the traditional boundary approach were fine—as long as our operating environment was simple and certain. In that environment utilities could stay comfortably in a reactive mode and sell and sell and sell. Economies of scale helped consumer receptivity considerably. Electric customers bought and bought and bought because electric power was an energy bargain.

Events of the late 1960s and early 1970s changed all that. For a variety of reasons—rising fuel prices, higher inflation and interest rates, internalized pollution costs, etc.—our former economies of scale withered away. Bringing new capacity on line raised rates for customers. Government initiatives for energy conservation and less oil use effectively increased our customers' monthly bills as well.

The new era of change had begun.

The first major change in the traditional boundaries of our business occurred on the supply side, as shown in Figure 2. It started to become commonplace for municipal customers and cooperatives to develop their own generating resources. They also negotiated with others for capacity and energy to serve themselves, but they still maintained the legal right to return to utility service when they wanted to. They also became interested in bypassing central station generators and serving customers' loads directly.

In the midst of building programs, utilities found themselves with excess capacity and started to look for markets to help spread their fixed costs. Often this brought them into competition with other investor-owned utilities' generating units.

New supply-side technologies like thermal energy, fuel cells, and photovoltaic cells were rewarded by generous federal and state tax incentives, which enhanced their adoption in the marketplace. Cogenerators, armed with favorable federal regulations that guaranteed their market, became another consideration on the supply side, and the first independent power producers made themselves known on the scene.

Clearly, the supply-side boundary of the utility business had begun to expand quickly. The scope of the utility business and the nature of utility marketing would eventually have to change with it.

The second major shift in utility boundaries occurred on the demand side, also shown in Figure 2. Remember how quickly "demand-side planning" became part of the industry's jargon? It showed up in the late 1970s and early 1980s in the "selling" of energy conservation programs, practices, and thinking. In the same family are load management programs offering bill credits in exchange for the privilege of cycling customers' equipment off and on during peak periods.

New technologies also offered new demand-side alternatives, thermal energy storage and industrial heat pump applications being a couple of current examples. Such technologies are certain to continue expanding in the future.

And finally, retail electric price pressure has moved cogenerators onto the demand side of the picture, where they would very much like to serve customers' loads directly through wheeling.

Expanded Boundaries

In this new, expanded environment, we are not concentrating simply on forecasting loads. We are attempting to shape loads to meet our company's objectives and our customers' needs. And, because of the close relationships we now share with neighboring utilities, today we are interested not only in our own load growth, but also in that of our neighboring utilities. Their load

J. C. Collier, Jr., is a senior vice president with Florida Power & Light Company.

Peter Garfield/Foto Inc.

Utilities' need to focus on individual segments within the spectrum of customers they serve has never been greater.

Figure 1

Traditional Boundaries

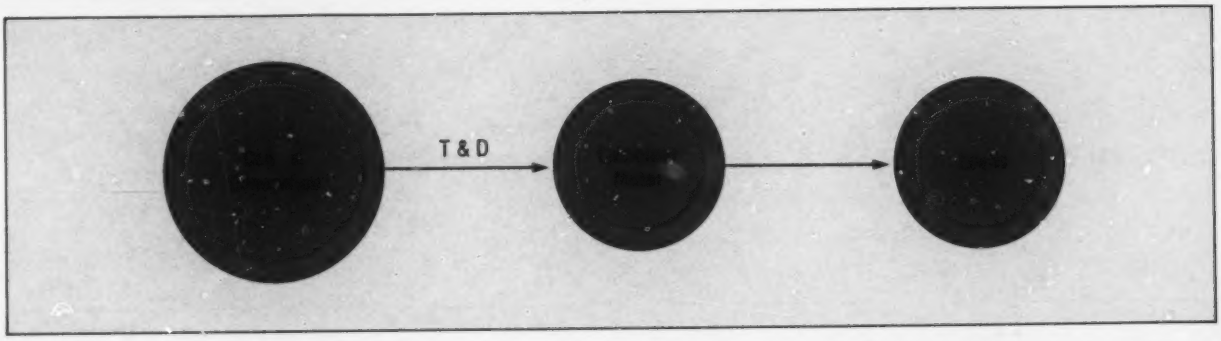
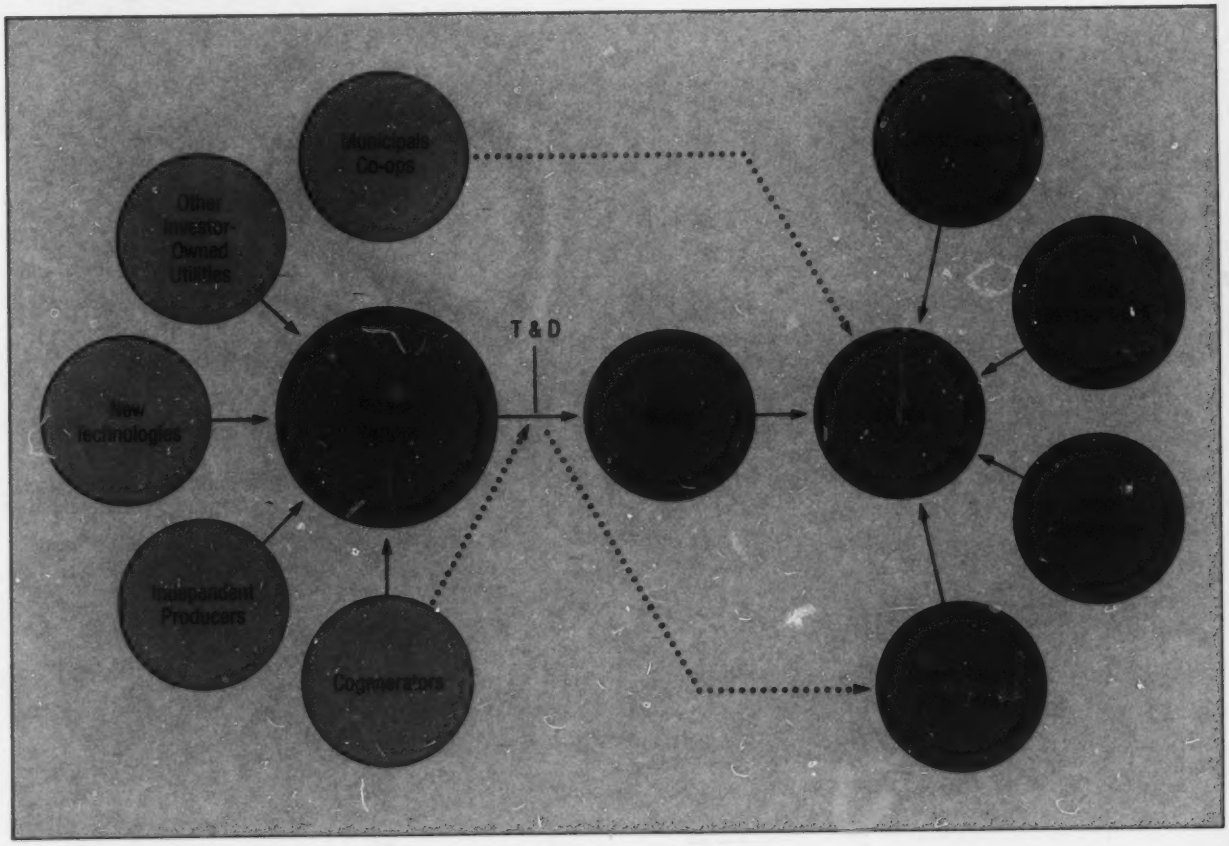


Figure 2

Expanded Boundaries



Potomac Edison

Potomac Edison's "Operation Hot Spot" program combines high-touch and high-tech traits to serve both residential and industrial customers. Using a van equipped with an infrared camera, customer service representatives help them detect heat losses at their homes and plants.

growth could have major competitive implications for us, positive or negative.

Awareness of the new boundaries of the business has complicated our lives, but it has also broadened our understanding of the universe in which we operate. We are dealing more closely with customers' reactions to new utility ideas, programs, and services, for their response can greatly change our fortunes. We have a new list of "soft" technologies to help us in such vital areas as customer behavior and market penetration.

As we've confronted our new reality, many utility people have said, "we're returning to marketing, just like the old days." But I say you can't go back to where you've never been. We were going through the motions in the old days, promoting all electric homes and electric appliances, etc., but we weren't marketing.

Marketing, as I see it, is the process by which we find out what customers want, how they want it, when they want it, maybe even why they want it, and how much they are willing to pay for it. Then it is up to us to give it to them and to make sure they are happy with it.

The concept may sound simplistic, but I assure you that executing it properly is not easy. It requires sophisticated thinking, thinking beyond the traditional utility boundaries, and it requires sophisticated tools.

One of those tools is an approach: that is, we market from the customer's point of view. We on the utility side do not decide what's good for our customers and then give it to them. The marketing process begins with customers and their expression of needs and wants. We identify those needs and wants and then develop programs and services to meet them. We test our programs with customers to make sure we're meeting their needs, and then, and only then, do we implement the programs fully.

We find out what our customers need and want with a second tool, a model to identify and segment our customers.

First, think about your core customers—who are they, how would you characterize them by interest and electricity use? My core customers are residential customers living in multi-family dwellings. Generally in the lower income bracket, these customers represent low saturation of end uses, yet they are comfort seekers. Importantly, these core customers perceive themselves as having few options about utility service.

I characterize the appropriate marketing strategy for these customers as "high touch." That is, we should provide them with programs and services for increased comfort and cost control. Conservation programs, budget payment plans, and weatherization programs are likely candidates for meeting their wants and needs. And because they feel they have few options, it's particularly important to demonstrate a high degree of concern and caring for these customers.

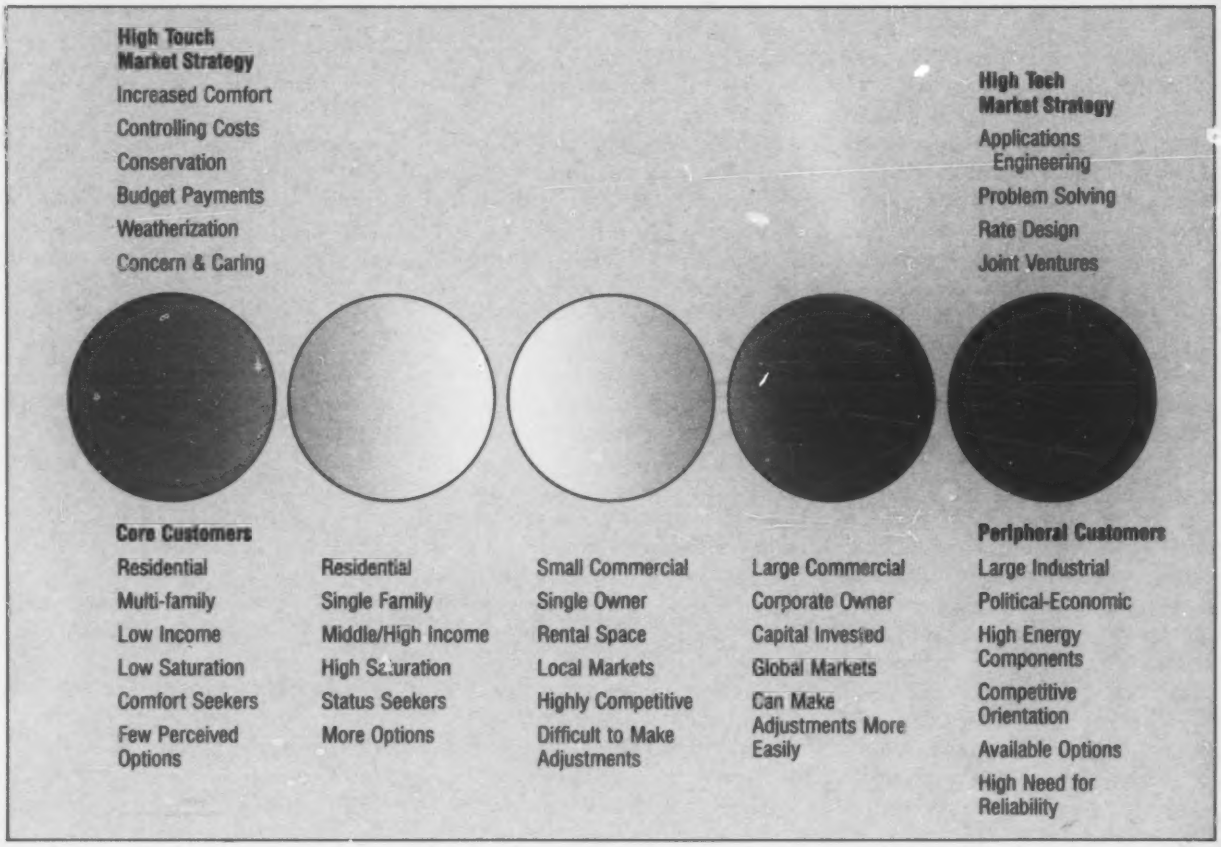
Now go to the other end of the continuum and think about who your peripheral customers are. In my scenario, peripheral customers are large industrials with significant economic and political power. These are production-oriented customers whose product costs have a high energy component. They need a competitive edge and high service reliability and will move elsewhere to get it. They have the highest number of options available to them.

From a marketing standpoint, this is an entirely different challenge than the core customer. These customers respond to a high-tech approach, which is characterized by applications engineering tailor made for their individual situations. They want problem solving, consulting-type assistance. They want our active involvement in efficiency and flexible rate design. They even may be amenable to joint ventures with their utility company. For them, our concern and caring show up in their bottom line.

When we place the core customer at one end of a continuum and the peripheral customer at the opposite end, we can construct a customer identification and segmentation

Figure 3

Model Spectrum of Marketing Strategies and Customer Types



Robert Shafer/Folio Inc.

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Because small commerical customers don't have as much financial flexibility as large commercial customers, they cannot make changes in their energy equipment and practices as easily.

model, as shown in Figure 3. In between the core and peripheral customers, there are probably limitless variations. For simplicity's sake, I've included only three other typical customer segments.

For example, to the immediate right of the core customers, we have another group of residential customers who live in single-family homes. This group has a middle-to-high income level, seeks status, and represents a high end-use saturation level. These people have more options than the core customers. They can install a gas or solar water heater, for example. Because of these characteristics, the marketing strategy we use to reach these customers isn't quite as high touch.

Next is the small commercial customer group, those small businesses owned by a single individual and occupying leased space. They tend to serve local, highly competitive markets. It's difficult for them to make changes in energy equipment and practices. We could say that these customers really are similar to the residential single family group in their potential responsiveness to a medium-touch, medium-tech marketing strategy.

Next in line are the large commercial customers, representing corporations with high capital investments and global markets. These are more mobile than their small commercial neighbors, but don't quite have the clout of the large industrials. They need advice and counsel from their utility and certainly are concerned about the bottom line.

Of course, in order to fill in your own blanks in the model, you're going to need a third tool—research. Companies like Proctor & Gamble and Colgate-Palmolive spend millions of dollars a year to get to known their customers better. They root out intelligence about every aspect of the simple marketing definition I offered earlier: what their customers want, how they want it, when they want it, and how much they are willing to pay for it. These companies want to know whether or not the products being offered are meeting customers' needs. This research leads to product improvements, product cancellations, and new product introductions, but the key point is that those companies' fingers are never removed from their customers' pulse.

We too must know our customers better, and we already have at our disposal outstanding research tools that can draw clear demographic and psychographic portraits of every customer we serve. In fact, one efficient way to do this is by customer segmentation, and I invite you to use the model I've presented as a starting point for your examination and analysis.

Customer Segmentation

As you proceed, you'll find that segmentation can have far-reaching effects on your company. For ex-

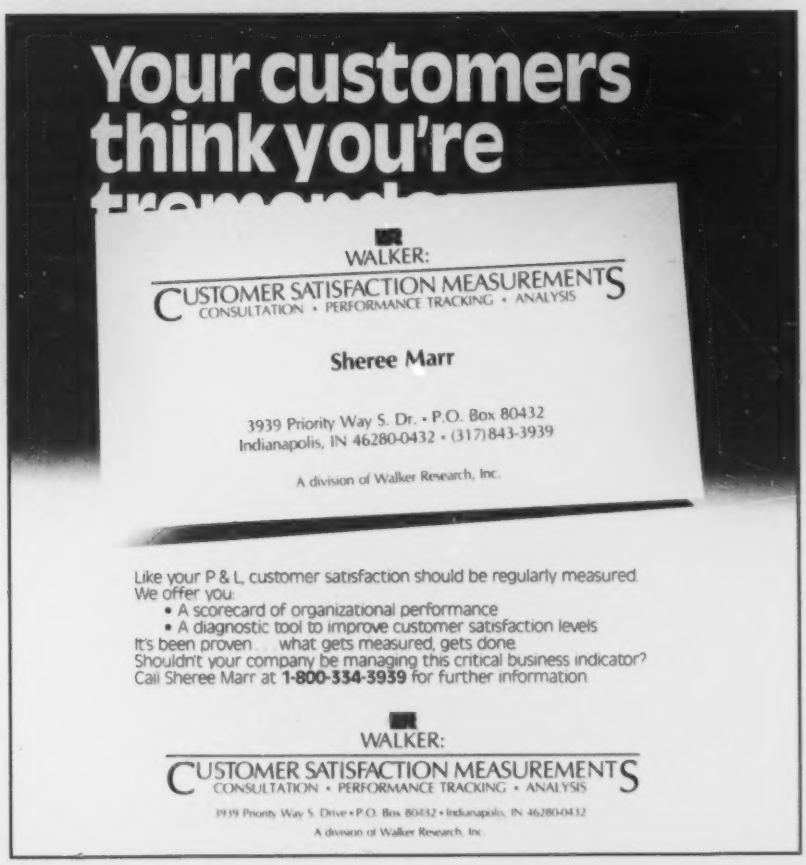
ample, you could consider the efforts your company puts forth in recruitment, in training, and in developing programs and services against this model to examine the customer segment you want to reach. You can see where on the continuum the customer falls, compare where your marketing effort falls, and determine just how good the match is. It can be an excellent tool for performing "reality checks" on whether or not your efforts are on target and for analyzing the marketing challenges you face. You may also find that to integrate a refined, segmented marketing effort fully in your company, you might benefit from reorganizing the marketing function by customer segment. Having specific groups of employees concentrating on meeting the specific needs of well-defined customer groups can be a powerful marketing tool.

The final tool I'll mention that is essential to successful marketing within today's expanded boundaries is an attitude: the willingness to deliver. We must be willing to respond to our customers' needs and reasonable wants. And then, when we do so, we must be willing to listen again and to respond to the feedback we receive on an ongoing basis.

This continuous process of listening and responding to our customers undoubtedly will lead to innovative marketing ideas, methods, and activities far beyond the scope of marketing within the traditional utility boundaries of "the good old days." Our new definition of marketing for today's utilities' boundaries involves much more than "how much electricity can we sell?" It is a process, the process of looking at the energy business strictly from the customer's point of view, knowing the customer through research, analyzing and possibly reorganizing through segmentation, and being responsive to the customer's expressed needs and wants before and after delivery of the product or service.

Of course, we all know that an adequate understanding of the customer is difficult to achieve. And, we can not forget that society continues to change. According to a report from the Roper Organization, old patterns of consumer demographics and psychographics are increasingly meaningless as consumer behavior is becoming more individualistic and less defined by reference to easily identified social groups. So, in the future, market research and marketing strategies in general will have to pay closer attention to actual consumer behavior and less to presumed demographic and psychographic categories.

If this trend continues, we'll have to add more columns to our customer segmentation model, making utilities' marketing challenge even more interesting and exciting. In fact, this very environment—an environment where change is the rule, not the exception—can actually serve the marketing function very well . . . *if* we do our homework. The key lies in our ability to anticipate accurately and respond quickly to the changes. With the right tools, the marketing function can thrive in an environment of change.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The Robots are Coming

As robotics technology matures, applications within the electric utility industry become more prevalent.

Faced with rising operating and maintenance costs, increasingly stringent personnel safety regulations, and the economic necessity to maintain and improve already high levels of system reliability, electric utilities are beginning to turn to robotics technology for help.

Industry studies conducted by the Electric Power Research Institute, the U.S. Nuclear Regulatory Commission, and Brookhaven National Laboratory indicate that the use of robotic devices can save a utility $10,000 to $100,000 a year. A handful of utilities, largely in the Northeast and Mid-Atlantic states, also are involved in testing and demonstrating robotic devices to gain operating experience with them and greater insight into evaluating their potential costs and benefits. Studies and field testing by Public Service Electric and Gas Company (PSE&G) and others indicate annual savings of approximately $50,000 to $200,000. And, in cases where robots have been used to reduce plant downtime, savings in excess of $500,000 per application have been reported.

Currently utilities use robotic devices primarily in nuclear power plants, but they can also be applied to fossil-fired plants and transmission and distribution systems. In the early stages of their evolution now, these robotic devices are the direct descendents of the remote manipulators and teleoperators developed in the late 1940s to handle radioactive materials. They interact with their environment and their human operators, who usually control them through a console located a safe distance away from a hazardous environment.

Robots in Nuclear Power Plants

Over the last 35 years robotics technology in the nuclear industry has been largely confined to use in spent fuel reprocessing, post-irradiation analysis, waste management, and research and development. Today the industry is modifying and adapting this technology for direct use in nuclear power plants. Typical application areas being considered include primary containment inspection, reactor maintenance, routine health physics tasks, various operation and maintenance procedures, facility decontamination and decommissioning, and post-accident recovery.

The motivation for using robots in nuclear power plants is to reduce maintenance costs and to keep personnel radiation exposure "as low as reasonably achievable" (as recommended by the Nuclear Regulatory Commission). Specifically, the application of robotics technology in nuclear power plants offers several potential benefits:

- Reduce radiation exposure dose to personnel and reduce maintenance crew size correspondingly
- Improve maintenance program performance
- Result in less waste material to handle and dispose of
- Enhance equipment availability and reduce plant downtime
- Lead to a multi-purpose robot or a family of robots for use at plant sites
- Result in significant cost savings

Of course, the economics of using a particular device must be evaluated on a case-by-case basis since nuclear plants differ in design. The factors that should be considered in this evaluation are listed in Table 1.

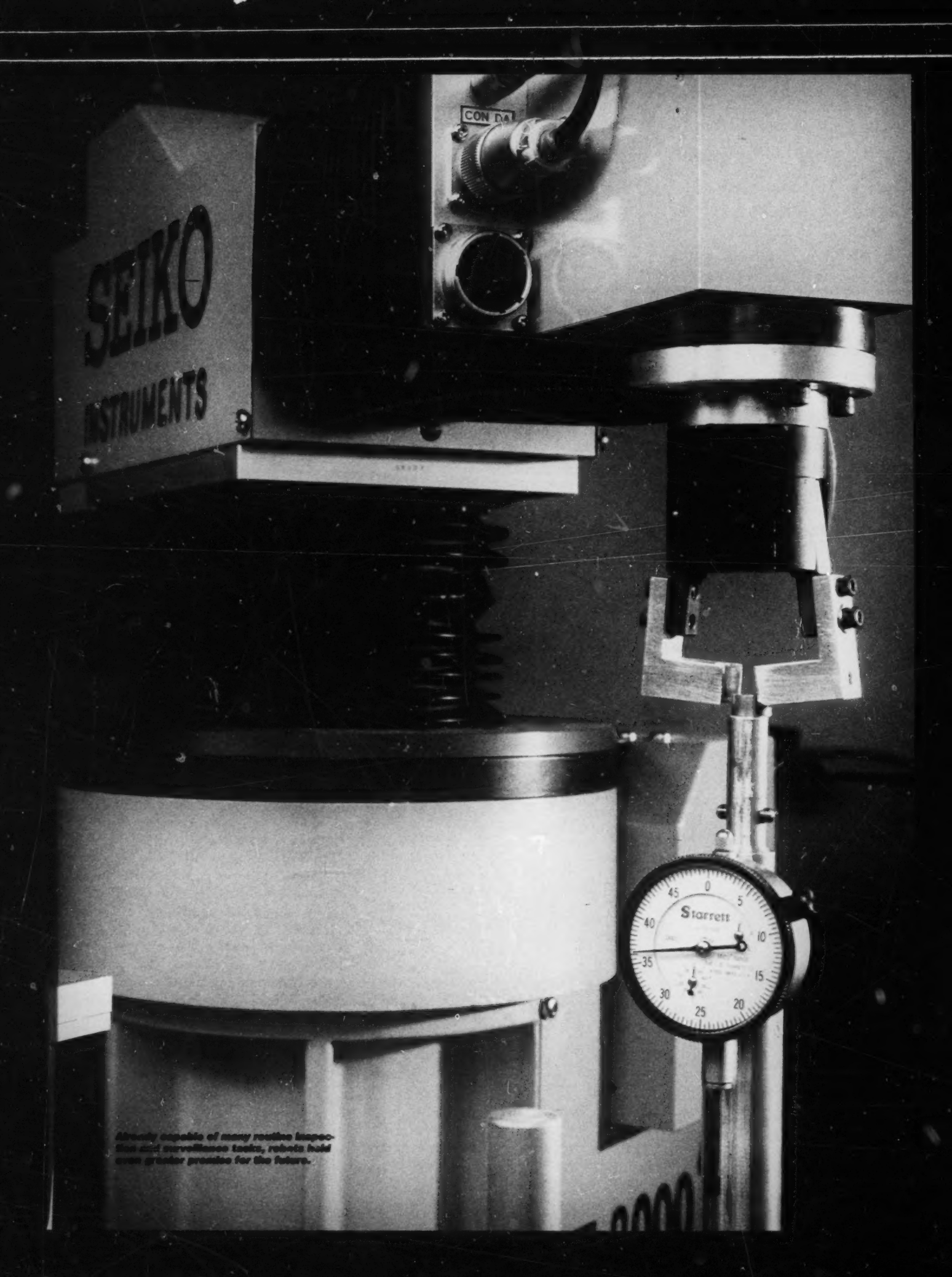
Much of today's knowledge of robotic applications in nuclear power plants stems directly from the use of robotic devices for the clean up of Three Mile Island Unit 2. Since the accident there in 1979, the testing and development of such devices for use at TMI 2 have given the nuclear industry an unparalleled opportunity to measure the performance of robotic devices over a wide range of radiological hazards. More importantly, it has served to illustrate how such devices may be planned for retrofit into existing nuclear power plants.

Today's robots can go into controlled radiation areas and perform routine surveillance and inspection tasks, thus reducing man-rem exposure and manpower costs. Some can even perform minor tasks such as material retrieval, swipe sampling, and remote camera inspection. For all practical purposes, these devices are mobile instrumentation packages designed to gather environmental and radiation data.

Tomorrow's more sophisticated robotic devices will be able to per-

Harry T. Roman is principal engineer—research—at Public Service Electric & Gas Company.

Al Cook/Uniphoto



Already capable of many routine inspection and surveillance tasks, robots hold even greater promise for the future.

form operations and maintenance tasks within power plants. Table 2 presents a condensed list of potential robotic applications that PSE&G has identified for use in its nuclear generating stations.

Robots in Fossil Power Plants

Robots can, of course, be adapted for use in fossil plants, but the compelling cost savings associated with reducing personnel radiation exposure is missing, weakening their economic advantage. Nevertheless, the strong industry trend toward adopting programs to extend the life of fossil plants will dictate more frequent and vigorous maintenance routines as well as online automated data-collection processes. As these needs increase, so may the need for and value of robot-based systems and distributed intelligence and muscle around the plant. Also, fossil power plants have their share of hazardous, monotonous, and repetitive tasks that could, perhaps, justify robotic devices.

Table 1

Robotic Application Economic Factors

Cost Savings
Factors associated with minimizing workers' entry into controlled radiation areas:
personnel exposure to radiation and physical hazards
reduction in manhours
reduction in crew size
improved worker safety
repeatability of job performance
savings in manhours for health physics monitoring
reduction in safety equipment, hardware, laundry, and instrumentation
reduction in radioactive waste
performing multiple tasks in a work environment with the plant "at power"
Reduction in work injury.
Reduction of plant downtime.
Use of robots in spill or leak cleanup.
Expenses
Purchase price of robot.
Site specific installation.
Robot operation and maintenance
Robot utilization (single/multiple use).
Operator/technician training.
Decontamination expenses in moving robot around plant.
Robot support staff.

Recent studies by the Electric Power Research Institute (EPRI) and other studies by PSE&G working in conjunction with Foster Wheeler Development Corporation have identified a number of potential robotic applications for fossil plants. Those identified by PSE&G and Foster Wheeler are listed in Table 3.

Of particular interest are devices that can be used to inspect tubes in water-walled boilers in order to predict potential material failure. According to the North American Electric Reliability Council, boiler tube failures are the leading cause of availability loss (over 6 percent) in U.S. fossil plants, and EPRI estimates that more than 80 percent of all boiler tube failures force a shutdown. Because a typical outage lasting three days can cost a utility $750,000 for replacement power, robotic devices that could automatically inspect and survey the condition of boiler tubes would surely benefit utilities.

In a series of field tests, PSE&G and Foster Wheeler recently demonstrated that gas- and oil-fired units are suited to the use of a motorized remotely controlled vehicle to perform nondestructive ultrasonic inspection of boiler tubes. How well the vehicle performed depended on how clean the tubes were of scale and deposits. In coal-fired boilers or where heavy deposits are present, automated devices would be needed to clean the tube before inspection, or, perhaps, a single mobile robot with separate cleaning and inspection capabilities would be preferable. The development of such a mobile robot was the subject of a recent request for proposal by EPRI.

T&D Robotics

In transmission and distribution

(T&D) systems, robotic applications are a largely unexplored area. The premier research effort to date has been conducted by EPRI, Philadelphia Electric Company, and the Southwest Research Institute. Their TOMCAT robot, a remote manipulator or teleoperator mounted on the boom arm of a utility bucket truck, represents today's state of the art in T&D robotic devices.

The TOMCAT (teleoperator for operations, maintenance, and construction using advanced technology) is a multifunction tool that allows a lineperson to perform maintenance tasks safely on high voltage lines (65kV-1000kV) during inclement weather. This human-operated manipulator was adapted from an underwater application and can be operated from an environmentally safe cab area on the ground. It has already proven itself successful in demonstrations on de-energized and energized lines and has been used to hose down transformers at Philadelphia Electric's Peach Bottom plant.

Table 4 presents a listing of possible applications of robotics technology in substations and switching stations. Based on ideas generated at an EPRI seminar on T&D robotics and combined with thoughts of the author, the list of applications is broken into three distinct categories. Preprogrammed tasks can be programmed into a robot and could be performed without a human present or with a human present only occasionally to initiate a sequence of tasks. Teleoperated tasks can be performed in real time with the robot acting as a remote manipulator operated by a human located on site or at another manned station. Complex semi-autonomous or autonomous tasks require robots more sophisticated than those likely to be available in the next 5–15 years. They require robots to have "senses" (i.e., sight, touch, etc.) enhanced by artificial intelligence.

Getting Involved

In an effort to accelerate the application and development of cost-effective utility robotic systems and

Table 2

Potential Nuclear Power Plant Robot Applications

Radiation monitoring/general health physics tasks/smear tests.
Sampling radioactive systems.
Small spill cleanup.
Changing filters.
Steam generator inspection and repair.
Roving robot uses:
routine radiation monitoring
steam, gas, fluid leak detection
noise, vibration
security/intruder alerts
valve/critical instrumentation/equipment status verification and operation
infra-red scan
Condenser tube sheet inspection and repair.
Firefighting.
Spill or leak monitoring/cleanup/repair.
Restricted access/hazardous environment maintenance.
Reactor containment inspection.
Internal/external pipe inspection/repair.
Equipment and tool transporters.
Pipe/tube x-raying.
Sandblasting or chemical cleaning of metal parts and components prior to machining, milling, or repair.
Turbine inspection during operation.
Snubber inspection.
Worker observation in hazardous areas.
Reactor cavity cleaning.
Flange unbolting/rebolting.
Pipe welding.
Pool cleaning.
Underwater inspection.
Valve repair.

Table 3

Potential Robotic Applications for Fossil Power Plants

Safety
Fire watch and fire fighting
Hazardous waste spills and cleanup (including asbestos insulation removal)
Accident and personnel injury assistance
Gas turbine room inspection

Maintenance
Boiler tube repair/welding
Tool delivery
Valve bonnet removal
Painting
Sand/grit blasting
Pipe cleaning
Leak/spill cleanup
Condenser tube cleaning and repair
Tank maintenance
Materials handling
Rotating equipment alignment
Vacuum systems

Operation
Performance monitoring and sampling
Fuel
Water
Steam
Coal barge unloading
Coal pile grooming
Emissions testing
Acoustic leak detection

Inspection
Boiler tubing—panels and coils
Condenser tubing
Heater tubing
Cooling water intake screens
Internal pipe
External pipe
Electrostatic precipitator

to create a viable mechanism for the effective transfer of appropriate technology, several electric utilities promoted the formation of the Utility/Manufacturers Robot Users Group (U/M RUG). Formed in February 1986, this no-dues paying group comprises more than 140 engineers and scientists representing a spectrum of utilities, robot manufacturers, developers, and researchers, service and consulting groups, national laboratories, and academic and research organizations.

U/M RUG provides a forum where users' needs and manufacturers' technology can be brought together to identify new application areas, propose the development of new equipment, and assess the cost-benefit potential of robotic technologies. It is hoped that this mutually beneficial exchange will help push robotics from a technology-driven market to a cost-driven market.

The Future of Robotics

Robotic applications do not stand by themselves unrelated to the rest of the activities that normally go on in a modern power plant. Utility management must see robotics in its true perspective—yet another link in the chain of technologies that

Table 4

Possible Robot Applications for Substation/Switching Stations

Preprogrammed
General Station Security
Survey Yard Areas
Clean Insulators (Energized)
Cut Grass
Apply Herbicides
Reading Meters/Dials
Clean Floors
Inspect Station Batteries

Teleoperated
Operate Energized Equipment
Open Energized Disconnect Switches
Operate Test Equipment
Fight Fires
Add Gas to Energized Equipment
Inspect Air Circuit Breakers and Other Equipment
Clean Transformer Coolers
Contain Hazardous Materials Spills
Torque Equipment Bolts
Bleed Potheads

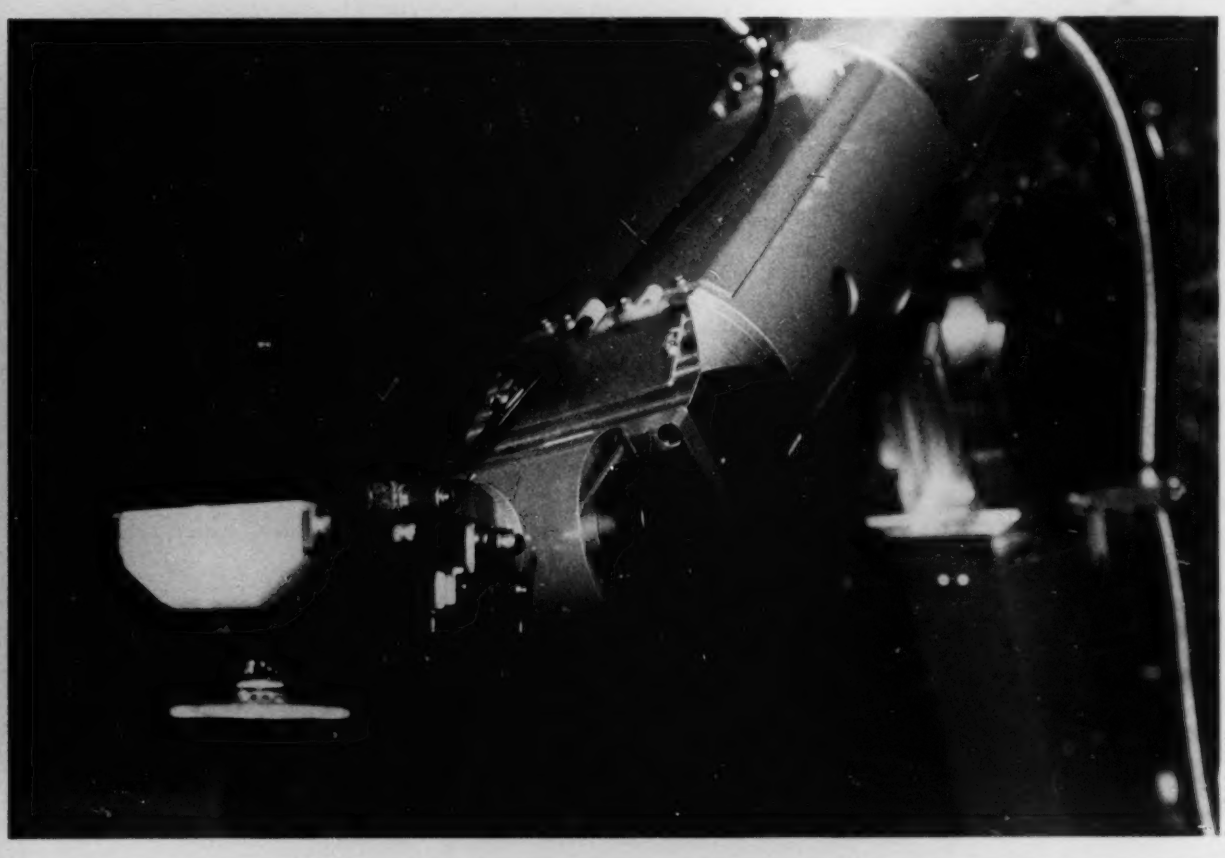
Semi-Autonomous/Autonomous
Repair Oil/Water Leaks on Underground Piping
Replace Shunt Capacitors
Painting
Open Transformers and Inspect
Remove Debris/Ground Care

Right:
Demonstrating tactile sensitivity and fluidity of motion, a robot moves a full glass of wine without spilling a drop.

Table 5

Historical Perspective for Robot and Artificial Intelligence Applications in Power Plants

Plant Monitoring and Diagnostics	Time Period	Relation Information—Action Sequence
Gauges, dials, meters . . . etc.	1900–1950s	Direct human information gathering, followed by direct human action.
Sensors, hard-wired instrumentation, augmented with camera systems and alarms.	1960s–70s	Remote information gathering, followed by direct human action.
Preprogrammed/automated machines/systems to perform simple tasks.	1980s	Remote information gathering, followed by preprogrammed action; with the emergence of mobile man-machine systems.
Mobile robotic devices in predictable/structured environments. Expert systems assisting humans in making diagnostic decisions.	1990s	Remote information gathering, followed by direct human action at a distance; real time man-machine interactions using mobile robotic devices.
Artificially intelligent mobile robots in completely unstructured environments.	2000 +	Autonomous integration of remote information followed by synthesized action through the use of AI/ Expert Systems; requiring little or no direct human action.



Stacy Pick/Unipho

automate and integrate diverse plant functions.

Table 5 attempts to provide a historical perspective on the development of robotics technology and its inevitable merging with the technology of artificial intelligence, or AI. The current state of the art of robotics in power plant applications allows only for such devices to perform inspection, surveillance, and monitoring tasks. However, simultaneous advances in robotics and AI technologies, including the use of tracked bases, improved manipulators, and onboard intelligence, will eventually result in robotic devices becoming commonplace for plant maintenance.

It is conceivable that just beyond the turn of the century fully autonomous, artificially intelligent robotic devices will survey and inspect various areas of power plants, substations, and switching stations, and, based on the data collected, that they will then determine the appropriate maintenance procedure to be performed and carry out the task. Perhaps a central computer system in charge of a robotic work force will dispatch an intelligent mobile robot to a specific area of the plant in response to an operational alarm; or, a robot might be dispatched automatically on a routine basis to inspect and maintain a piece of equipment.

Of course, this vision probably could not be achieved in many of the power plants existing today—their many site-specific differences would prohibit the cost-effective retrofit of robotic devices. In the future, however, if standardized plant designs become more than the proposals so frequently advanced in utility forums today, such a vision could be made reality.

Now, while orders for new plants are low, is exactly the time to think about the future and begin mapping a course for it. Standardized, modular plant designs could emphasize the initial integration of robots and artificially intelligent devices into the basic plant layout. The improvements in operating and maintenance practices and procedures that robotics technology would then make possible would lead ultimately to longer lived and more efficient plants.

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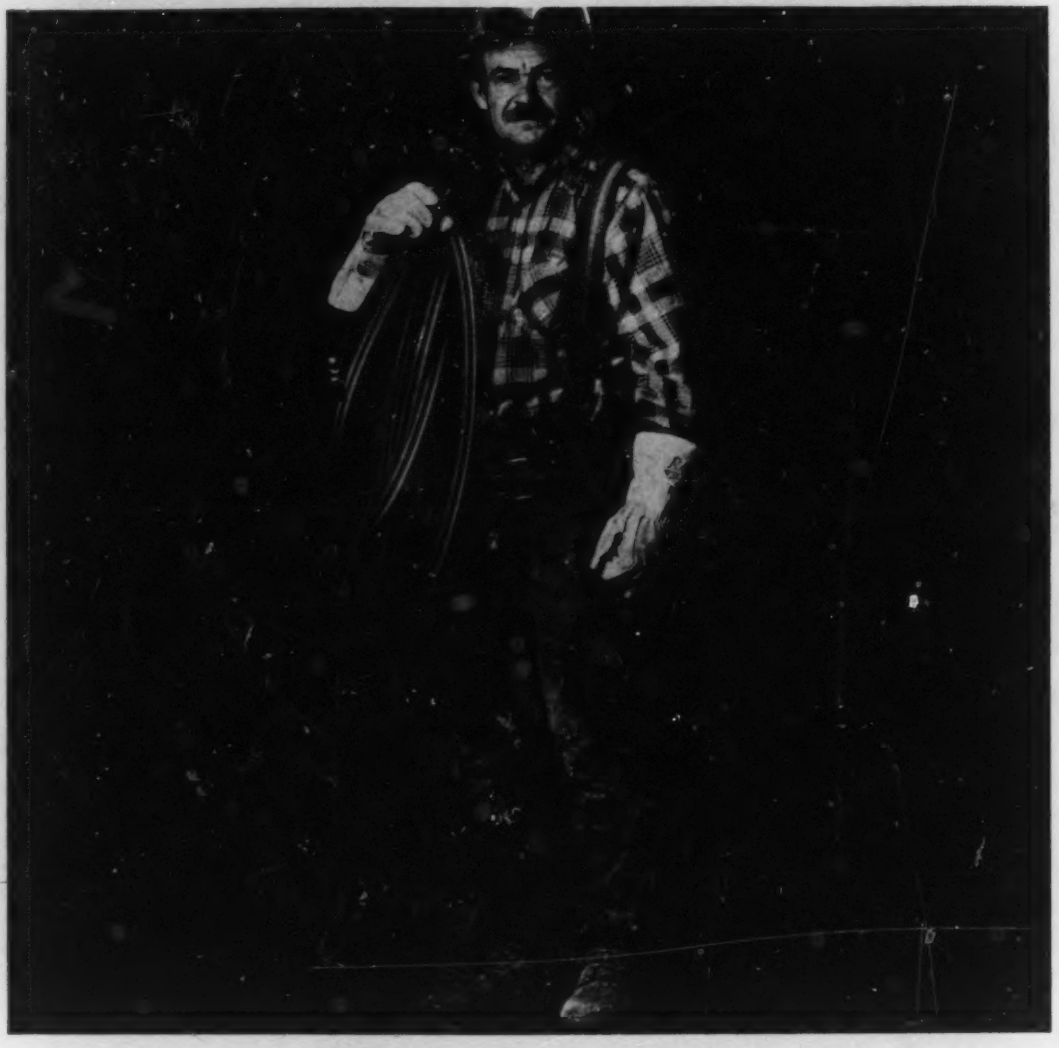

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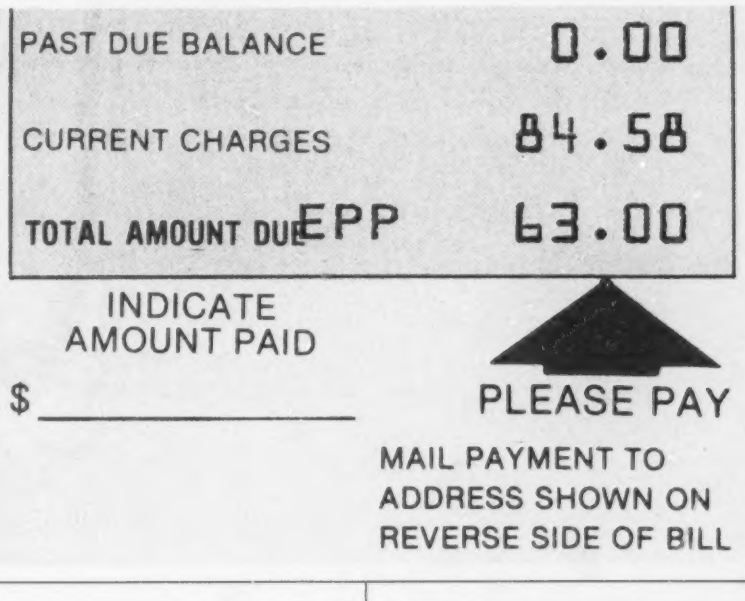
STATISTICAL REVIEW

LEVEL BILLING PROGRAMS

Customers participating in level billing programs are, in general, more satisfied with their electric company than non-participants are according to a recent report by Cambridge Reports, Inc. The report, "Level Billing Programs in the Investor-Owned Electric Utility Industry," summarizes the results of a survey of electric companies designed to examine their policies and experience with residential level billing programs.

The survey found that 85 percent of the companies have only one level billing program for their residential customers, although all combination utilities with such programs for their electric customers also have them for their gas customers. Relatively few (36 percent) of the companies have level billing programs for their commercial customers.

Those companies with two programs tend to have one for customers who have a hard time paying their bill—those with arrears problems—and one for other customers who want to level their bills for other reasons. This difference in orientation for the programs shows up not only in differences in multiple programs offered by the same company, but also in the programs offered by different companies. Some companies clearly emphasize the first reason for offering the program—that is, finding a way to help low-income customers pay their bills—while others emphasize more general goals of improved customer service or company image building as reasons for offering level billing programs.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$
PLEASE PAY
MAIL PAYMENT TO ADDRESS SHOWN ON REVERSE SIDE OF BILL

Most level billing programs (88 percent) do not have a limited sign-up time, nor do they have extensive limits on eligibility (either on the basis of home ownership or length of residence). The most common method used to calculate monthly payment amounts is the twelve-month rolling average (47 percent), and the most common means used to calculate payment levels for new customers on the program is, not surprisingly, the past twelve months' usage. Very few programs offer any sign-up (6 percent) or continuing (8 percent) incentive for customers participating in the programs, and, similarly, very few charge (4 percent) or offer to pay (9 percent) interest on account balances.

Nearly half of all companies interviewed (43 percent) report no more than 5 percent of their residential customers on level billing programs; nearly two-thirds (64 percent) report participation levels at or below 10 percent. At the other end of the scale, 17 percent have participation rates over 20 percent.

While there are some characteristics of companies and service territories that are linked with higher program participation rates (companies that started programs after 1976, larger companies, and companies with relatively high electric rates or a lower number of heating degree days), the most important factor affecting participation rates seems to be the way that companies have structured and marketed the programs. Company representatives report that the largest increases in participation have come after the program was opened to non-heating customers, when an example level bill was sent to all customers, or after similar types of actions. In other words, those programs that are seen as being appropriate for all customers rather

than just for low-income customers are those that appear to have the highest participation rates.

Nearly all companies (92 percent) advertise their level billing programs, and the most common medium used is, not surprisingly, bill inserts (96 percent). One-third of the companies interviewed have used newspaper advertising in this effort. A majority (61 percent) of all those doing advertising say that it has been successful in increasing program participation. Those using television or radio advertising are somewhat more likely to report success than are others. As expected, the most common communication themes in the advertising focus on taking the surprises out of electric bills and on helping to budget expenses.

Relatively few companies appear to keep detailed information about drop-out rates for customers on level billing programs. But, those with such information indicate that drop-out rates are very low and average participation rates are over ten years.

A slight majority (60 percent) of all companies indicate that they are able to determine if energy usage among level billing customers is different from that of comparable customers not on the program. Almost all of those with this information say that usage is the same, but about one in six say that usage is higher among level billing customers—by between 1 and 5 percent. No company reports that usage is lower among level billing customers than among others.

Two-thirds of those companies that have done the necessary customer research indicate that customers on the level billing program are, in general, more satisfied with the company than are those not on the program. Additionally, no company reports that satisfaction is lower among such customers than among those not on the program. Some company representatives also spontaneously mentioned that customers generally like the program and that it prompts positive attitudes toward the company not only from those who participate but also from other customers who simply know that the program exists.

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FINANCIAL REVIEW

SECOND QUARTER EARNINGS PER SHARE UP 7 PERCENT

Investor-owned electric utility earnings per share, before extraordinary items, increased 7.0 percent from $0.57 in the second quarter of 1986 to $0.61 in the second quarter of 1987. Much of the gain was attributable to a strong 5.1 percent increase in total electricity sales, increases in historically volatile nonoperating income, and only a slight increase in operating expenses. For the twelve months ending June 30, 1987, earnings per share rose 1.8 percent over the same period a year ago.

Electric operating income rose 6.6 percent on the strength of a 3.3 percent increase in electric operating revenues, some of which may be attributable to a number of companies making accounting changes to include unbilled revenues. Electric operating expenses experienced a modest increase of 1.6 percent, with fuel expenses remaining stable from a year ago, and other operation and maintenance expenses increasing by 3.6 percent—the lowest quarterly rise since the fourth quarter of 1985. Quarterly income tax expenses were also down from a year ago, declining by 6.6 percent (deferred income taxes and investment tax credits declined 10.1 percent and 89.2 percent, respectively, due primarily to the Tax Reform Act of 1986, while current income taxes increased 34.0 percent).

The quality of earnings continued to improve as allowance for funds used during construction (AFUDC) continued to decline. AFUDC as a percentage of net income available for common dropped from 47.7 percent during the 2nd quarter of last year to 34.2 percent this quarter. Phase-in plans (cost deferrals and phase-in revenues) as percentage of net income available for common rose from 8.8 percent to 12.0 percent over the same period (the net effect of phase-in plans for the 2nd quarter was a noncash increase to net income of $473 million, representing a 55 percent increase over the 2nd quarter 1986 net phase-in effect of $306 million). The pre-tax interest coverage ratio for the second quarter, excluding AFUDC, increased to 2.47 from 2.32 a year ago.

The industry's balance sheet further strengthened during the second quarter due to strong retained earnings growth as well as a drop in construction expenditures and the completion of construction projects during the period. Utility plant rose 9.1 percent to $339.8 billion over the same quarter last year, while construction work in progress (CWIP) dropped by 16.1 percent. The industry's equity capitalization ratio also improved, rising from 42.1 percent for the year ending June 30, 1986, to 43.0 percent for the year ending June 30, 1987. Of note is a second quarter increase of 23.2 percent in short-term debt over the same period a year ago.

The earned return on average common equity (ROE), before extraordinary items, for the year ending June 30, 1987, remained stable at 13.6 percent. The lack of movement was due to a 6.3 percent increase in retained earnings and a 2.8 percent increase in common stock, which offset the quarter's earnings growth.

Tables 1 and 2 are based on unaudited reports submitted by a sample of investor-owned electric utilities. The sample is representative of approximately 95 percent of the utility industry's total assets and 94.5 percent of its total operating revenues. The data were extrapolated to represent the entire investor-owned electric utility industry. Data for the 2nd quarter of 1986 have also been revised to reflect a number of reported restatements.

Table 1
Investor-Owned Electric Utility Industry Statement of Income (Unaudited)
(Millions of Dollars)

	Three Months Ending June 30,			Twelve Months Ending June 30,		
	1987	1986r	% Change[5]	1987	1986r	% Change[5]
Total Electric Operating Revenues[1]	$31,126	$30,140	3.3	$129,692	$125,941	3.0
Electric Operating Expenses						
Fuel	$ 7,758	$ 7,757	0.0	$ 31,651	$ 34,971	(9.5)
Other Operation & Maintenance	9,186	8,868	3.6	36,479	33,221	9.8
Depreciation & Amortization	3,158	3,003	5.2	12,160	10,916	11.4
Costs Deferred Under						
Rate Phase-In Plans	($259)	(201)	29.0	(454)	—	N.A.[2]
Taxes Other Than Income Taxes	2,447	2,288	6.9	9,748	9,151	6.5
Income Taxes: Federal & Other	1,223	913	34.0	6,970	5,808	20.0
Deferred Income Taxes	1,270	1,413	(10.1)	5,368	4,639	15.7
Investment Tax Credits, Net	42	387	(89.2)	481	1,935	(75.1)
Total Electric Operating Expenses	$24,824	$24,428	1.6	$102,403	$100,641	1.8
Electric Operating Income	$ 6,303	$ 5,913	6.6	$ 27,289	$ 25,300	7.9
Other Utility Operating Income	191	263	(27.5)	1,276	1,467	(13.0)
Total Utility Operating Income	$ 6,493	$ 6,176	5.1	$ 28,565	$ 26,767	6.7
Other Income & Deductions—Net	408	259	57.4	1,937	2,397	(19.2)
Phase-in Deferrals	214	105	103.6	406	—	N.A.[2]
Allowance for Other Funds Used						
During Construction	833	1,072	(22.3)	3,820	4,682	(18.4)
Total Income Before Interest Charges	$ 7,948	$ 7,612	4.4	$ 34,728	$ 33,846	2.6
Interest Charges						
Interest on Long-Term Debt	$ 3,602	$ 3,771	(4.5)	$ 14,714	$ 15,009	(2.0)
Other Interest Expenses & Charges	312	223	39.8	1,051	975	7.8
Allowance for Borrowed Funds Used						
During Construction	(516)	(595)	(13.3)	(2,203)	(2,604)	(15.4)
Net Interest Expenses & Charges	$ 3,398	$ 3,399	(0.0)	$ 13,563	$ 13,380	1.4
Net Income Before Extraordinary Items	$ 4,550	$ 4,213	8.0	$ 21,165	$ 20,466	3.4
Extraordinary Items	1	(23)	N.M.	(510)	(1,997)	(74.5)
Net Income	$ 4,550	$ 4,190	8.6	$ 20,655	$ 18,469	11.8
Preferred Dividends Declared	608	695	(12.5)	2,626	2,864	(8.3)
Net Income Available for Common	$ 3,942	$ 3,495	12.8	$ 18,029	$ 15,605	15.5
Common Dividends Declared	3,156	2,991	5.5	12,389	11,894	4.2
Additions to Retained Earnings	$ 786	$ 504	56.0	$ 5,640	$ 3,711	52.0
Average Shares Outstanding[3]	6,425	6,137	4.7	6,412	6,188	3.6
Earnings Per Share Before						
Extraordinary Items[4]	$ 0.61	$ 0.57	7.0	$ 2.89	$ 2.84	1.8
Earnings Per Share After						
Extraordinary Items[4]	$ 0.61	$ 0.57	7.0	$ 2.81	$ 2.52	11.5
Common Dividends Per Share[4]	$ 0.49	$ 0.49	0.0	$ 1.93	$ 1.92	0.5

[1]Revenues are adjusted for intra-industry sales for resale of electricity.
[2]Values for 1st quarter of 1986 not available.
[3]Adjusted for stock splits.
[4]Based on average shares outstanding as reported to EEI by survey respondents and adjusted for stock splits.
[5]Percent changes may reflect changes due to greater detail/roundings.
r—Revised to reflect company restatements for the 2nd quarter of 1986.
N.M.—Not Meaningful.

Table 2
Investor-Owned Electric Utility Industry Balance Sheet
(Unaudited)
(Millions of Dollars)

Assets	June 30, 1987	June 30, 1986r	% Change
Utility Plant[1]			
Utility Plant (Including Nuclear Fuel)	$399,839	$366,324	9.1
Less Accumulated Depreciation	109,612	99,659	10.0
Total	$290,227	$266,665	8.8
Construction Work in Progress	71,171	84,791	(16.1)
Net Utility Plant	$361,398	$351,456	2.8
Investments	10,061	8,444	19.2
Current Assets	37,181	36,526	1.8
Deferred Debits	24,147	19,885	21.4
Total Assets	$432,788	$416,311	4.0
Capitalization & Liabilities			
Capitalization			
Common Stock	$ 88,595	$ 86,170	2.8
Retained Earnings	50,396	47,388	6.3
Preferred Stock	28,410	30,736	(7.6)
Long-Term Debt	155,667	153,177	1.6
Total Capitalization	$323,068	$317,471	1.8
Current Liabilities			
Short-Term Debt	$ 7,519	$ 6,103	23.2
Long-Term Debt Due Currently	4,724	4,562	3.5
Other Current Liabilities	28,528	26,720	6.8
Total Current Liabilities	$ 40,771	$ 37,386	– 9.1
Deferred Credits			
Capital Lease Obligations, Non Current Portion	$ 5,513	$ 3,758	46.7
Accumulated Deferred Income Taxes[2]	38,346	35,378	8.4
Accumulated Deferred Investment Tax Credits	16,601	16,470	0.8
Other Deferred Credits	8,490	5,848	45.2
Total Deferred Credits	$ 68,950	$ 61,454	12.2
Total Capitalization & Liabilities	$432,788	$416,311	4.0

[1]Includes non-electric utility plant.
[2]Includes property-related deferred income taxes.
r—Revised to reflect company restatements.

THIRD QUARTER EARNINGS PER SHARE UP 1.1 PERCENT

Investor-owned electric utility earnings per share, before extraordinary items, increased from $0.94 in the third quarter of 1986 to $0.95 in the third quarter of 1987—an increase of 1.1 percent. For the twelve months ending September 30, 1987, earnings per share rose 3.2 percent over the same period a year ago.

The modest increase in third quarter earnings per share is attributable to three factors. First, despite a large number of rate decreases approved by state commissions, electric operating revenues rose 3.7 percent due to a strong 6.4 percent increase in electricity sales. Unusually warm weather in parts of the country contributed to this large sales increase. Second, a number of non-electric sources of income—other utility operating income, AFUDC, and other income and deductions—dropped by a combined 27.4 percent. Utility gas operations were particularly hard hit during the quarter as gas demand decreased while average utility gas prices rose 5.7 percent. The result was a net loss of $24 million in other utility operating income—the first loss since EEI began collecting financial statement data. Third, total electric operating expenses increased by only 2.5 percent, due in part to a small 1.0 percent rise in fuel expenses and a 13.5 percent drop in quarterly income tax expenses. (Deferred income taxes and investment tax credits dropped by 37.0 percent and 44.1 percent, respectively, due largely to the Tax Reform Act of 1986, while current income taxes rose by 4.4 percent.)

The quality of earnings again improved for the industry as the largest source of noncash income, AFUDC, declined during the third quarter. AFUDC as a percentage of net income available for common declined from 27.9 percent during the third quarter of 1986 to 20.0 percent this quarter. Phase-in plans as a percentage of net income available for common rose from 5.1 percent to 8.4 percent during the same period. The net effect of phase-in plans for the third quarter was a noncash increase to net income of $525 million, representing a 76 percent increase over the $298 million increase to net income experienced a year ago.

The industry's dividend payout ratio dropped from 54.0 percent to 51.3 percent due to a number of companies reducing dividend payments in response to regulatory actions associated with the completion of construction projects.

The pre-tax interest coverage ratio for the third quarter, excluding AFUDC, was 3.47, representing a 1.0 percent increase over the 3.44 attained a year ago. The interest coverage ratios including AFUDC, for the same periods, were 3.78 and 3.14 respectively. The embedded cost of long-term debt for the twelve months ending September 30, 1987, was 9.3 percent. For the twelve months ending a year ago, the embedded cost of debt was 10.1 percent.

The industry's balance sheet continued to strengthen as utilities boosted their retained earnings by 8.6 percent from a year ago, while reducing their construction expenditures. Additions to retained earnings for the third quarter rose a very healthy 13.4 percent. Utility plant rose 9.1 percent to $410.0 billion, while CWIP dropped by 15.5 percent to 72.0 billion. The industry's equity capitalization ratio also improved, rising from 42.8 percent for the year ending September 30, 1986, to 43.5 percent for the year ending September 30, 1987. The increasing proportion of equity in the industry's capital structure is supported by a decrease in the amount of preferred stock. The preferred stock capitalization ratio dropped from 9.4 percent to 8.6 percent over the same year-to-year period.

The ROE, before extraordinary items, for the year ending September 30, 1987, was 13.3 percent—a slight drop from the second quarter's ROE of 13.6 percent. An 8.6 percent increase in retained earnings along with a 2.6 percent increase in common stock contributed to the drop in ROE.

Note that the earnings per share figures include the effects of some nonrecurring changes in the value of company assets but not those of nonrecurring items relating to nonregulated activities. The frequency of write-offs, write-downs, asset sales, and accounting changes during 1987 has, thus, made the impact of such nonrecurring items on the industry's financial statements more pronounced than in previous years.

Tables 3 and 4 are based on unaudited reports submitted by a sample of investor-owned electric utilities. The sample is representative of approximately 93.1 percent of the investor-owned electric utility industry's total assets, and 94.5 percent of its total operating revenues. The data were extrapolated to represent the entire investor-owned electric utility industry. Data for the third quarter of 1987 have also been revised to reflect a number of reported restatements.

Table 3
Investor-Owned Electric Utility Industry Statement of Income (Unaudited)
(Millions of Dollars)

	Three Months Ending September 30,			Twelve Months Ending September 30,		
	1987	1986r	% Change[5]	1987	1986r	% Change[5]
Total Electric Operating Revenues[1]	$37,295	$35,949	3.7	$130,770	$125,941	3.8
Electric Operating Expenses						
Fuel	8,896	8,810	1.0	31,670	34,971	(9.4)
Other Operation & Maintenance	9,868	9,039	9.2	37,419	33,221	12.6
Depreciation & Amortization	3,206	2,891	10.9	12,406	10,916	13.7
Costs Deferred Under Rate Phase-In Plans	(287)	(198)	44.9	(741)	—	N.A.[2]
Taxes Other Than Income Taxes	2,621	2,508	4.5	9,821	9,151	7.3
Income Taxes: Federal & Other	3,063	2,935	4.4	7,154	5,808	23.2
Deferred Income Taxes	853	1,353	(37.0)	4,780	4,639	3.0
Investment Tax Credits, Net	237	424	(44.1)	358	1,935	(81.5)
Total Electric Operating Expenses	$28,457	$27,762	2.5	$102,867	$100,641	2.2
Electric Operating Income	$ 8,838	$ 8,187	8.0	$ 27,903	$ 25,300	10.3
Other Utility Operating Income	(24)	41	(157.5)	1,145	1,467	(22.0)
Total Utility Operating Income	$ 8,814	$ 8,228	7.1	$ 29,048	$ 26,767	8.5
Other Income & Deductions—Net	391	565	(30.8)	1,749	2,397	(27.0)
Phase-in Deferrals	211	84	151.2	617	—	N.A.[2]
Allowance for Other Funds Used During Construction	785	1,031	(23.8)	3,570	4,682	(23.8)
Total Income Before Interest Charges	$10,202	$ 9,908	3.0	$ 34,984	$ 33,846	3.4
Interest Charges						
Interest on Long-Term Debt	$ 3,633	$ 3,738	(2.8)	$ 14,575	15,009	(2.9)
Other Interest Expenses & Charges	286	215	33.1	1,122	975	15.1
Allowance for Borrowed Funds Used During Construction	(460)	(583)	(21.1)	(2,075)	(2,604)	(20.3)
Net Interest Expenses & Charges	$ 3,459	$ 3,370	2.6	$ 13,623	$ 13,380	1.8
Net Income Before Extraordinary Items	$ 6,743	$ 6,538	3.1	$ 21,361	$ 20,466	4.4
Extraordinary Items	52	(93)	N.M.	(383)	(1,997)	(80.8)
Net Income	$ 6,795	$ 6,445	5.4	$ 20,978	$ 18,469	13.6
Preferred Dividends Declared	606	667	(9.1)	2,571	2,864	(10.2)
Net Income Available for Common	$ 6,189	$ 5,778	7.1	$ 18,407	$ 15,605	18.0
Common Dividends Declared	3,174	3,119	1.8	12,595	11,894	5.9
Additions to Retained Earnings	$ 3,015	$ 2,659	13.4	$ 5,812	$ 3,711	56.6
Average Shares Outstanding[3]	6,427	6,226	3.2	6,371	6,234	2.2
Earnings Per Share Before Extraordinary Items[4]	$ 0.95	$ 0.94	1.1	$ 2.95	$ 2.82	4.6
Earnings Per Share After Extraordinary Items[4]	$ 0.96	$ 0.93	3.2	$ 2.89	$ 2.50	15.6
Common Dividends Per Share[4]	$ 0.49	$ 0.50	(2.0)	$ 1.98	$ 1.91	3.7

[1]Revenues are adjusted for intra-industry sales for resale of electricity.
[2]Values for 1st quarter of 1986 not available.
[3]Adjusted for stock splits.
[4]Based on average shares outstanding as reported to EEI by survey respondents and adjusted for stock splits.
[5]Percent changes may reflect changes due to greater detail/roundings.
r—Revised to reflect company restatements for the 3rd quarter of 1986.
N.M.—Not Meaningful.

Table 4
Investor-Owned Electric Utility Industry Balance Sheet
(Unaudited)
(Millions of Dollars)

Assets	September 30, 1987	September 30, 1986r	% Change
Utility Plant[1]			
Utility Plant (Including Nuclear Fuel)	$410,000	$375,720	9.1
Less Accumulated Depreciation	114,065	103,025	10.7
Total	$295,935	$272,695	8.5
Construction Work in Progress	72,015	85,256	(15.5)
Net Utility Plant	$367,950	$357,951	2.8
Investments	10,424	9,029	15.4
Current Assets	42,453	39,238	8.2
Deferred Debits	26,020	20,643	26.0
Total Assets	$446,847	$426,861	4.7
Capitalization & Liabilities			
Capitalization			
Common Stock	$ 90,773	$ 88,462	2.6
Retained Earnings	53,632	49,403	8.6
Preferred Stock	28,573	30,441	(6.1)
Long-Term Debt	159,039	153,952	3.3
Total Capitalization	$332,016	$322,258	3.0
Current Liabilities			
Short-Term Debt	$ 6,044	$ 5,314	13.7
Long-Term Debt Due Currently	5,003	5,880	(14.9)
Other Current Liabilities	31,540	29,343	7.5
Total Current Liabilities	$ 42,587	$ 40,537	5.1
Deferred Credits			
Capital Lease Obligations, Non Current Portion	$ 5,104	$ 3,877	31.7
Accumulated Deferred Income Taxes[2]	40,184	35,491	13.2
Accumulated Deferred Investment Tax Credits	17,187	17,116	0.4
Other Deferred Credits	9,770	7,582	28.9
Total Deferred Credits	$ 72,244	$ 64,066	12.8
Total Capitalization & Liabilities	$446,847	$426,861	4.7

[1]Includes non-electric utility plant.
[2]Includes property-related deferred income taxes. EEI now reports property-related deferred income taxes as a liability rather than a reduction of plant.
r—Revised to reflect company restatements.

REGULATORY REVIEW

IPPs PROPOSALS

Addressing the U.S. Senate Committee on Energy and Natural Resources at hearings held earlier this year to discuss proposals being drafted by the Federal Energy Regulatory Commission (FERC), William McCollam, Jr., president of Edison Electric Institute, offered five principles unanimously agreed to by EEI's board of directors that must be incorporated in any regulatory changes involving independent power producers (IPPs) if the long-term best interest of electric utilities' customers are to be met. That part of his testimony, including the reasoning behind the principles, is excerpted here.

First," . . . utilities must be able to build for themselves either under traditional regulation, or to compete as an IPP, in and outside their service territories.

"If the purpose of relaxing regulations for IPPs is to foster additional power supply options at a competitive price, then it is nonsensical to forbid the most experienced supplier from serving its own customers. This would limit competition. Forbidding utilities from competing effectively to serve their own needs, either as an IPP or under regulation, would be a step backward. It certainly would not be a step toward a more competitive market and more reliable electric system. It would inhibit our flexibility, not enhance it.

"Furthermore, utilities must be able to compete on the same terms as independent IPPs. For example, an IPP can be financed entirely through debt, a less expensive method of financing. However, regulated utilities are usually required to maintain a balanced structure of debt and equity to ensure more financial stability. If utilities are required to maintain those ratios, IPPs clearly would have a significant financing advantage. In addition, an IPP can sign long-term fixed-rate contracts, allowing it to retain all of the benefits of reduced construction or operating costs. It can also protect itself from the consequences of reduced demand for its power by take-or-pay contracts. These barriers to effective utility participation should be removed. Utilities believe they can compete with IPPs, given an equal chance.

"Other biases also exist against fair utility participation in the FERC competitive bidding scheme. For example, the Public Utility Holding Company Act (PUHCA) places restrictions on utilities and their subsidiaries which would shut them out from the IPP market altogether. FERC must resolve this imbalance in order not to discriminate against would-be participants in any competitive bidding scheme.

"I urge the Senate to look carefully at any program which prevents utilities from serving their own customers. Any proposal for change should provide increased flexibility to allow utilities to better respond to fluctuating economic conditions. We should expand our opportunities, not limit them.

"Another principle adopted unanimously by the EEI Board is that utilities should not be required to buy from IPPs. The decision to buy or not must be a truly voluntary one, subject to appropriate state regulatory review. A true competitive market gives the purchaser the freedom to choose from among a variety of power supply sources. Without that freedom, an unregulated supplier may charge excessively high rates or provide inadequate service. Under federal and state regulation, the obligation to serve rests with electric utilities and FERC is not proposing to alter that. With this obligation, utility management must be left with the flexibility to decide how to fulfill it. If utilities are required to purchase from IPPs, the result could be inefficient power supply decisions.

"EEI Directors adopted a third principle which states that the host utility must maintain control over the non-price factors affecting plants which will serve their customers.

"This does not mean that the utility can design the specifications to exclude competition. But utilities must be able to evaluate bids based on system and plant reliability, maintenance, scheduling, dispatchability, and other operational characteristics, fuel diversity, financial reliability and adequate security for long-term performance. These same factors are used by utilities when building their own plants. It is essential for the utility to maintain control over what factors are necessary in a bidding scheme if it is to continue to fulfill its obligation to provide adequate and reliable service to electric consumers. Such control will become even more important if there is increased reliance on third parties to supply significant amounts of future generation.

"The fourth principle is that all transmission must be truly voluntary, recognizing that voluntary transmission can be facilitated by more flexible pricing. The current system of voluntarily opening up transmission benefits *all* customers.

As the Committee knows, bulk electricity cannot be effectively stored. Electricity must be available to consumers instantaneously upon demand. Therefore, electricity transmission cannot be compared to the transmission of any other commodity or service. Any new system must not alter voluntary access to transmission or allow IPPs to "cherry pick" utility customers. Mandatory access is *not* a necessary element of the IPP proposal. The Commission can further facilitate voluntary bulk power supply transactions by providing for flexible pricing as has been done in the Western Systems Power Pool experiment.

"Finally, the Board is adamant that the Commission must proceed expeditiously with reforms to PURPA implementation. FERC must not consider the IPP proposal as a panacea for correcting the abuses in PURPA implementation. These abuses must be addressed promptly so that uniform PURPA reforms can be implemented by *all* states. Without this reform, electric consumers will continue to be harmed.

"Throughout the discussion of IPPs, our industry has debated one fundamental question: is this proposal simply trying to enhance our power supply options or, is it just one piece of a large plan to reexamine the broader questions of national energy policy in a way that will lead to a major restructuring of our industry? Unfortunately, we still are not certain of the answer to that question. The FERC staff indicated, in the technical conference [held last year], that they are simply trying to enhance future power supply options. However, as we discussed previously, utilities may be forbidden from owning IPPs in their own service territories, which to me means that we can no longer build plants to serve our own customers. That consequence can severely impact the structure and performance of the industry.

"Moreover, Chairman Hesse has announced as part of her electric strategy that she intends to address incentive regulation, bulk power transmission pricing, and other transmission pricing, and other transmission-related issues. Before such an electric strategy is put in place by FERC, effectively determining this nation's future energy policy, Congress and the public must be confident that all the pieces which have been pulled apart will fit back together to form a better and more efficient electric system than currently exists.

"After months of debate, major questions remain unanswered by FERC. Our industry does not believe that a need for a radical change in energy policy or in the industry's structure has been documented. Even if such a need existed, that type of change should occur only with careful review by Congress.

"We encourage both this committee and others in Congress to conduct further hearings after the FERC Notices of Proposed Rulemakings [related to these proposals] are published. Once the details are revealed, we urge FERC to allow ample time for Congress and the public to assess the impact this proposal will have on national energy policy and economy. . . ." ▰

TWELVE IMPECCABLE EXCUSES FOR NOT GIVING BLOOD.

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2. I'm type Z negative.
3. I'm on the grapefruit diet.
4. I gave six months ago.
5. I just got back from Monaco.
6. The lines are thirteen blocks long.
7. My mother won't let me.
8. I didn't sign up.
9. I'm going out of town.
10. Asthma runs in my family.
11. I forgot to eat this morning.
12. I'm allergic to flowering magnolia."

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American Red Cross

TECHNOLOGY REVIEW

SMES PROJECT UNDERWAY

With the award of $14 million two-year contracts to two competing research teams, the race is on to design an engineering test model of a superconducting magnetic energy storage system.

A state-of-the-art method of storing electrical energy in large superconducting magnets, SMES technology promises efficiency levels far superior to currently applied storage technologies because it can store electricity directly without first converting the energy to another form. It has great potential for holding down the cost of electricity by making it more economical for utilities to store power generated during off-peak hours for later use.

The Department of Defense awarded the contracts last November to two teams, one to be managed by Ebasco Services, Inc., and one by Bechtel Group, Inc. In addition to developing the conceptual design for an experimental model capable of storing 30 megawatt hours of energy, each team will develop and test materials and other critical components and study site selection.

Donald J. Helfrecht, chairman, president and chief executive officer of Madison Gas and Electric Company, calls the SMES project "perhaps the most significant step forward [taken to date] in assuring [the availability of a reliable supply of] inexpensive electric energy in the 21st Century." Central Wisconsin Development Corporation, a wholly-owned subsidiary of Madison Gas and Electric, is one of the members of the Ebasco Services team.

SMES technology was conceived 17 years ago at the University of Wisconsin-Madison by Professors Roger W. Boom and Harold Peterson. The long-term SMES program there has been funded principally by Wisconsin utilities, including Madison Gas and Electric, Northern States Power Company, Wisconsin Electric Power Company, Wisconsin Power and Light Company, and Wisconsin Public Service Corporation. Additional funding has been provided by the U.S. Department of Energy and the Electric Power Research Institute.

Upon completion of the work now under contract, the Department of Defense is expected to award a three-year contract covering the development, construction, testing, and initial operation of a prototype SMES.

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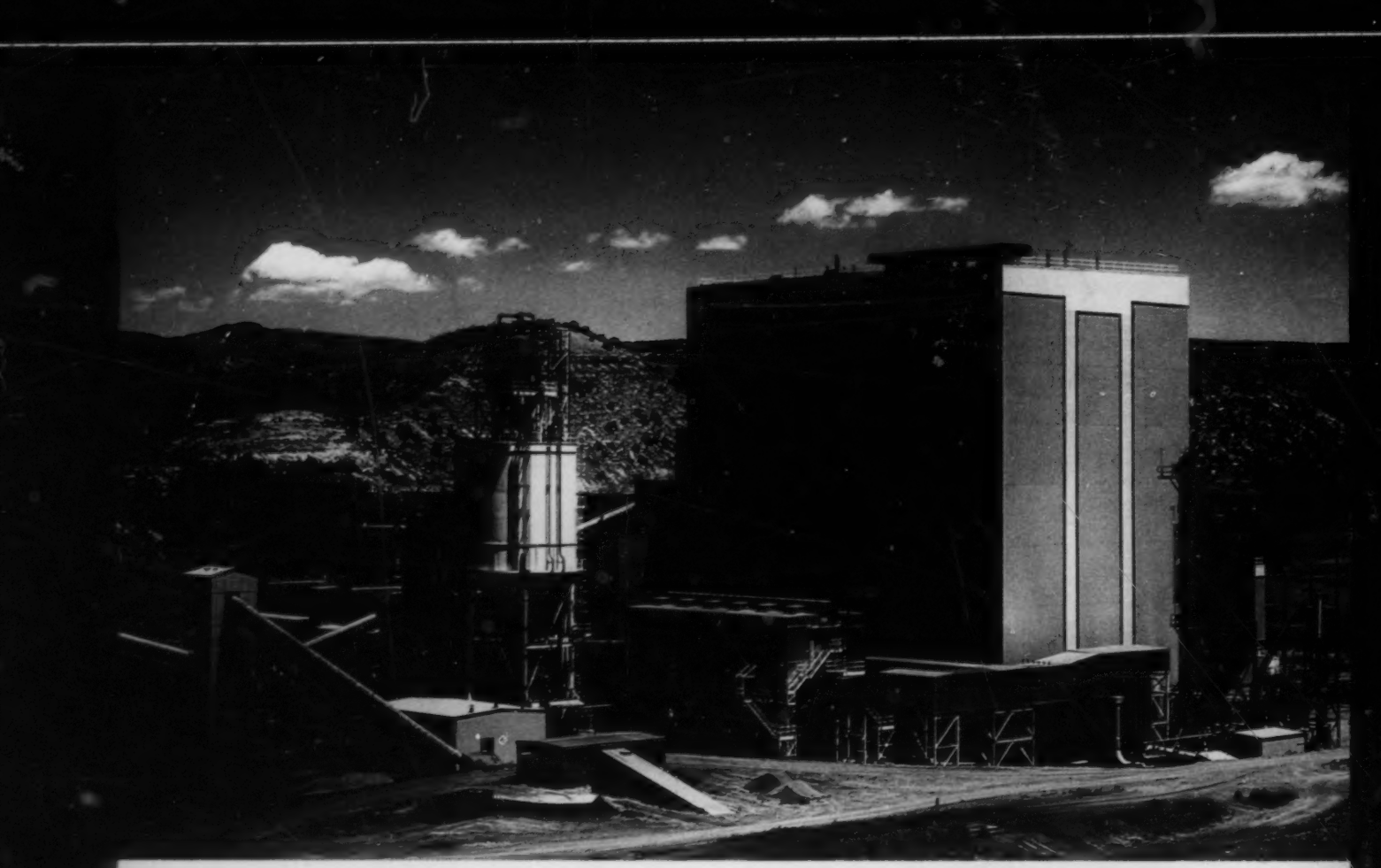


The world's first utility-scale circulating fluidized-bed combustion unit is now operational at Nucla Station.

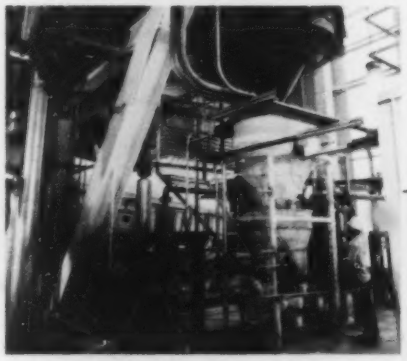
Colorado-Ute Electric Association's innovative decision to become the first U.S. utility to apply circulating fluidized-bed combustion (CFB) on a large scale is already paying off at Nucla Station. Not only has the life of this 25-year-old facility been extended, but efficiency is expected to dramatically increase as well.

While burning low-grade coal, Nucla's generating capacity will grow from 36 MW to 110 MW. And Colorado-Ute avoids the need for costly scrubbers, since in CFB combustion, limestone, shown on the right being fed into the system, is mixed directly with ground coal for a clean burn in which sulfur and nitrogen emissions are reduced.

United's Stearns-Roger Division teamed with Colorado-Ute on this landmark demonstration project. Stearns-Roger provided the design to integrate the CFB boiler into the plant and designed balance-of-plant systems. Colorado-Ute designed the limestone, coal and ash-handling systems, and cooling towers.

During the two-year testing of Nucla Station, Colorado-Ute will continue to lead the utility industry in application of fluidized-bed technology. Even now, Stearns-Roger is designing the next, much larger CFB retrofit for a generating plant in the Midwest.

For more information on our experience with this new technology, call or write our Power Business Development groups in Philadelphia or Denver.



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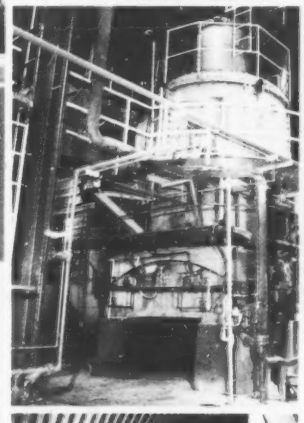
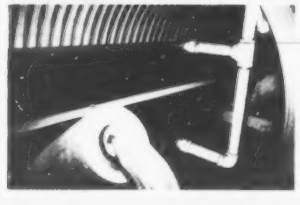
SPRING 1988

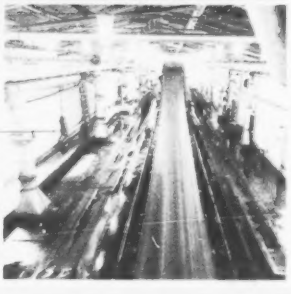
ELECTRIC PERSPECTIVES

Coal conversion completed on tight schedule

"The only way we could meet our schedule was to work with an AE that had been through this before. That's why we selected Sargent & Lundy and it paid off."
Kansas City Power & Light Company







When Kansas City Power & Light identified an opportunity to purchase less expensive low-sulfur coal for their Hawthorn and Montrose stations, they acted quickly. The contract was signed and the new coal was scheduled to start arriving at the Hawthorn station within one year. Since these plants originally were designed to burn high-sulfur coal, extensive modifications were required to the coal handling system and related equipment and structures prior to receiving the new coal at the plant.

A KCPL team was mobilized to spearhead this program. They visited other plants where similar high-sulfur to low-sulfur coal conversions had been made. From these visits, the KCPL team became aware of Sargent & Lundy's extensive experience with low-sulfur coal conversions and selected Sargent & Lundy to assist them with their Hawthorn and Montrose conversions.

The conversion projects were approached in two phases. During the first phase, design concepts, budget estimates, and schedules were prepared. After approval by KCPL management, S&L was authorized to proceed with the second phase consisting of design and procurement to support construction. At Hawthorn, only nine months remained from authorization of detail engineering and procurement to a previously scheduled 4-week maintenance outage during which the modifications were to be completed. Through careful planning and close cooperation by KCPL, S&L and the onsite contractors, the engineering and construction work was completed on schedule. A similar program is underway for the Montrose station.

The Hawthorn and Montrose low-sulfur coal conversion projects are examples of the results that are possible when a Sargent & Lundy betterment team tackles a challenging station modification.

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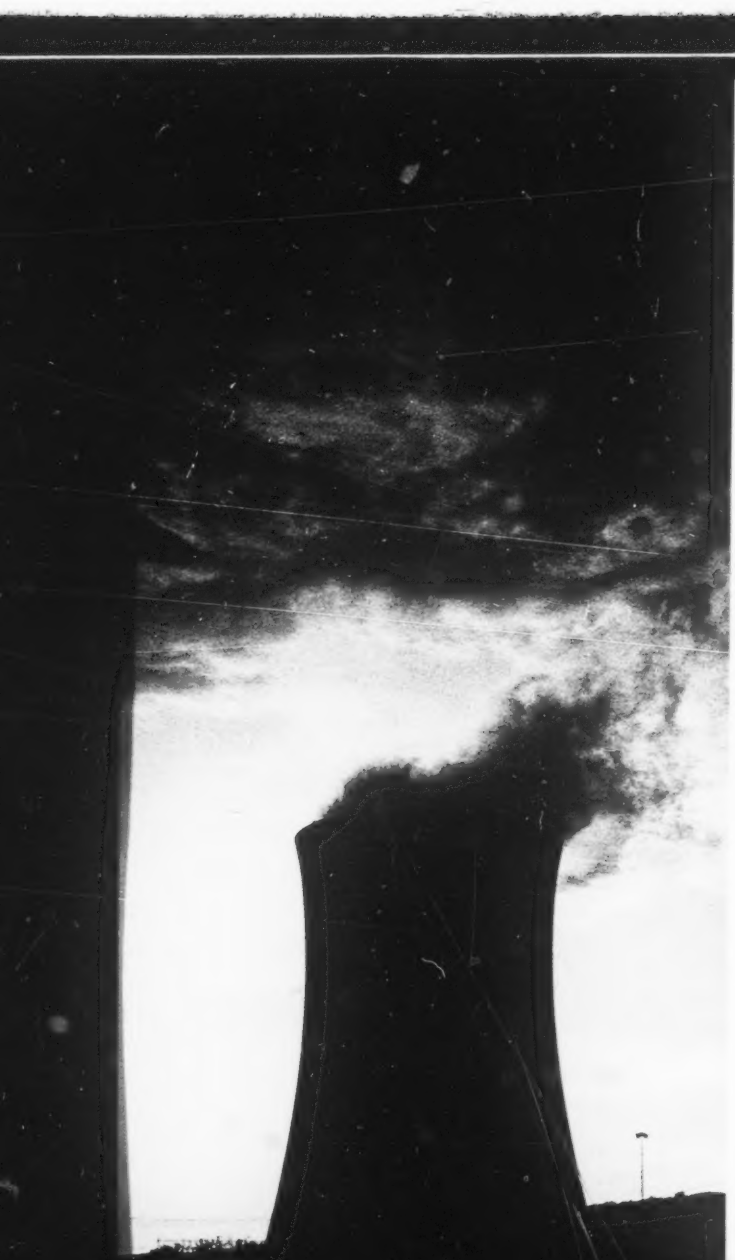

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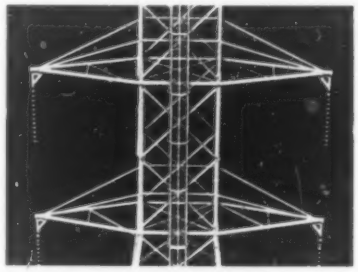

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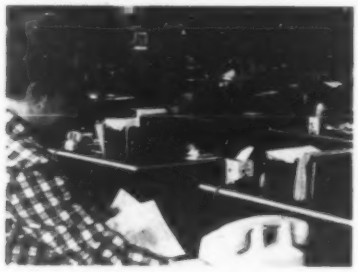

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Existing projects are proceeding as planned, without disruption or delay. Which is no small achievement, when you consider that we're currently managing projects totaling $15 billion in capital cost.

We're attracting new talent, too, building upon the skills and experience we've acquired over a span of 60 years. Now we're active in industries ranging from power and steel to chemical processing and biotechnology. There is hardly an area where we don't have project expertise.

Equally important, the spectrum of services we now offer is very possibly the broadest in the business. Conceptual design. Engineering. Construction. Plant maintenance. All are now available from a single, more capable source.

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1988 Perspectives On Electric Power

"For the sake of both customers and investors, we must make sure that change is not mistaken for progress."

Over the last several years, the investor-owned electric utility industry has demonstrated well its strength, stability, and flexibility in meeting the challenges of a changing economic and regulatory environment.

In 1987 we continued to make considerable progress, posting a strong financial performance and implementing a wide range of business strategies to adapt to new forms of competition, strengthen earnings, improve operating flexibility, and satisfy the diverse needs of customers.

The challenges facing the industry today are rooted in the energy dislocations of the 1970s and nurtured by the economics and politics of the 1980s. The changes we are making and the proposals for change being made by others are driven by broad concerns about the future need for power; how it will be met and at what price.

Over the next five years, both peak electric load and kilowatt-hour requirements are projected to grow an average of about 2 percent annually. Over the same period, capacity additions are expected to increase at an average annual rate of slightly over one percent. This gap will widen if growth is higher than anticipated, due either to rapid economic growth or severe weather, or if the anticipated increase in capacity does not materialize. . . .

The implications are clear: capacity margins will decline, and we continue to move closer to some form of new building cycle. A hint of what we may be seeing in future construction was revealed by our telephone survey this month of electric utility construction expenditures, which includes generation, transmission, and distribution. Compared to our spring, 1987, construction expenditure survey, this month's survey of member companies shows somewhat more than a $600 million increase in estimated construction expenditures for 1988.

Our industry is pursuing aggressively a number of policy reforms to improve the efficiency of the nation's power supply system to meet present and future needs while protecting the long-term interests of customers and investors.

As I reported to you last year, one area we have pursued vigorously is implementation of the Public Utility Regulatory Policies Act (PURPA). Since passage of PURPA in 1978, cogeneration has played an increasing role in supplying the nation's power. Based on data compiled by EEI, cogeneration supplied about 18,500 megawatts of capacity in 1986. Current projections indicate a possible doubling of cogeneration capacity by the year 2000.

Revisions are needed in implementing PURPA's avoided cost pricing, the cost utilities must pay for cogenerated capacity. Customers must be protected from paying more than can be justified for power from qualifying facilities (QFs) and from paying for capacity that isn't needed. Additional reforms in pricing for backup power supplies, operating and efficiency standards for cogenerators, and improved data collection by the Federal Energy Regulatory Commission (FERC) are needed to restore the original objectives of PURPA, which are to promote conservation, efficiency, and customer equity. Through regional conferences conducted last spring, FERC already has established a solid record on needed reforms and now should proceed expeditiously to implement them.

Some states have instituted a competitive bidding policy for QFs to help overcome problems with PURPA implementation. We support the adoption of such merit selection as an avenue to integrate QF power into a utility's resource plans efficiently and economically.

We also are examining the role of independent power producers (IPPs). As you may know, the FERC Chairman and her staff recently proposed the creation of a new class of independent power producers not subject to traditional regulation. The FERC Commissioners are expected to consider officially, in the near future, plans for proceeding with this proposal.

Many in our industry question the need for major FERC proposals

William McCollam, Jr., is president of the Edison Electric Institute, the national association of America's investor-owned electric companies. This article is adapted from an address he made to the New York Society of Security Analysts on February 24, 1988.

"The present system of voluntary, contractual transmission agreements is working well to serve all customers fairly and to increase flexibility in power supply."

in this area. If proposals do go forward, however, EEI's Board of Directors has unanimously agreed on a set of principles which must be incorporated in the regulation of IPPs to ensure that competition is fair and workable and to prevent jeopardizing the ability of utilities to serve their customers with an adequate and reliable power supply, as well as to protect investors.

First, utilities must not be required to buy from IPPs. Utilities must be able to choose from among all power supply alternatives, subject to appropriate state regulatory review.

Second, when purchasing IPP power, a host utility must maintain control over the non-price factors such as system and plant reliability, maintenance scheduling, dispatchability, fuel diversity, financial reliability, and adequate security for long-term performance.

Third, utilities must be able to build for themselves, either under traditional regulation, or to compete as IPPs on the same basis as other IPPs, in or out of their service territories.

In a footnote to an uncontested rate order issued January 15, 1988, for Orange and Rockland Utilities, the Commission defined an IPP as an entity with "no significant market power," "not affiliated with franchised utilities in the markets in which the IPPs sell power", and with "limited control of transmission facilities essential to (its) customers."

We have studied this definition and believe that, if applied broadly, it would prevent the most experienced supplier—the electric utility—from building to serve its own customers. This would limit competition and reduce power supply options, thus possibly increasing costs.

A further concern is the increased risk and transfer of risk which unregulated power suppliers could place on regulated utilities. We are sensitive to the fact that some analysts have evaluated the fixed payments of a take or pay contract with an IPP as additional fixed payments for the utility, thus raising the utility's risk. As an example, last month an electric utility's credit rating was lowered in part because of a "purchase power contract" from an IPP. In addition, purchased capacity which fails to materialize, is unreliable, or comes from highly debt leveraged IPPs may jeopardize reliability and increase the cost of capital. FERC must ensure that IPPs shoulder the risks of, as well as share the profits from, reduced regulation.

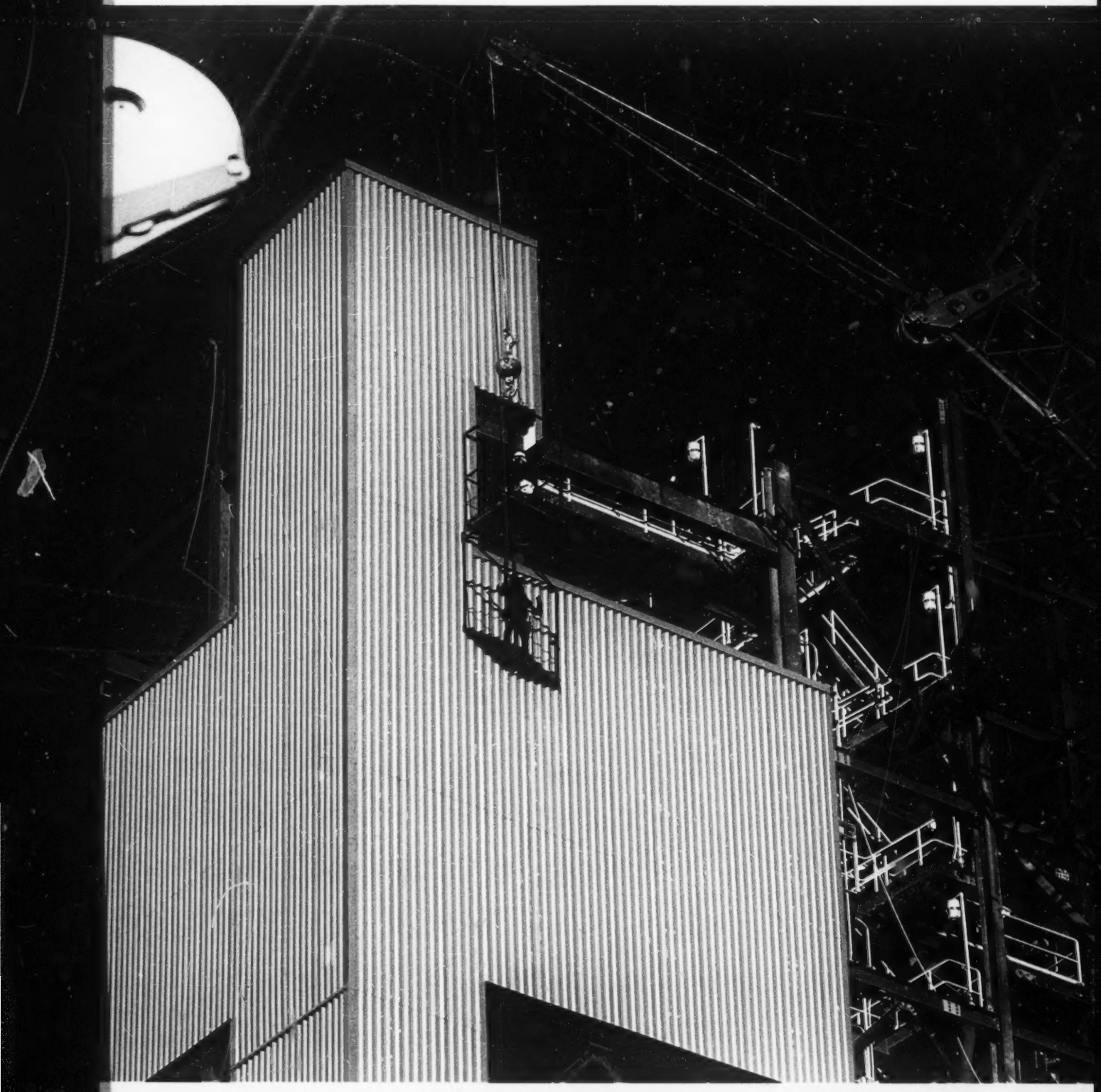
Closely related to the issue of supply is the question of use of the nation's electric transmission lines.

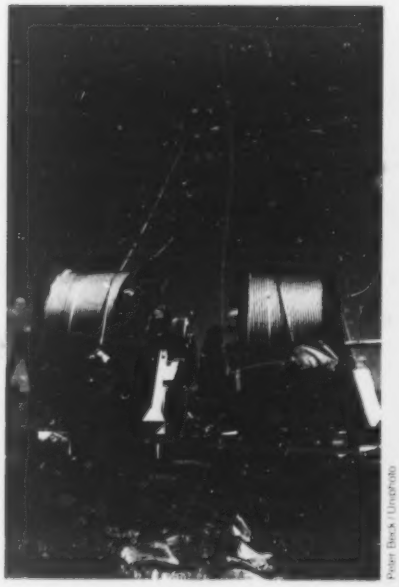
Under the guise of competition, third party power producers, municipals, and large end-use retail customers are pressing for changes which would give them mandatory access to transmission systems at the expense of other customers and at the risk of seriously affecting reliability and quality of service.

The present system of voluntary, contractual transmission agreements is working well to serve all customers fairly and to increase flexibility in power supply. Bulk power sales between utilities have steadily risen and now represent about 16 percent of all power sold to end-users in the country. Between 1976 and 1985, the amount of electricity wheeled in transmission agreements increased by 111 percent.

John Zoiner/Unipixels

Compared to last year's survey, this year's survey of EEI member companies "shows somewhat more than a $600 million increase in estimated construction expenditures for 1988."





Peter Beck / UtiliPhoto

"Approximately 20,000 miles of new transmission lines are now under construction or planned for the next ten years. . . ."

Bulk power supply transactions can be further expanded through appropriate pricing and related terms and conditions for transmission services. Our specific proposals to increase flexibility, predictability, and certainty in transmission service have been presented to FERC and we continue to press for improvements in this area.

As transmission demand increases, coordination among utilities in planning and operating the bulk transmission systems is key to ensuring reliability. Approximately 20,000 miles of new transmission lines now are under construction or planned for the next ten years, an increase of about 10 percent in the total number of circuit miles in service. Companies project that spending for transmission facilities will increase from $1.9 billion in 1985 to $2.7 billion in 1988. Siting of new lines remains difficult, however, and some areas of the country, particularly in the Northeast, will continue to see their systems heavily utilized.

The industry's successful response to change and competition is reflected in 1987's operating and financial trends. Electricity sales were very strong last year, up 4.1 percent, and peak load increased 3.5 percent. These increases primarily were due to greater electricity use by industrial customers and to unseasonable weather in parts of the country.

Based on an assumed GNP growth rate of approximately 2 percent and moderate to strong growth in industrial production, industrial sales will continue to grow through most of 1988. Overall, we expect electricity sales to rise by about 1.5 percent this year, given a lower anticipated GNP growth and normal weather compared to last year. Over the long range, preliminary estimates indicate that electricity is likely to grow by approximately 2.0 to 2.5 percent annually through the year 2000, subject to technological change and the ongoing electrification of the economy.

Electric utilities continue to demonstrate they are strong competitors in the energy market. Based on the latest data available, electricity

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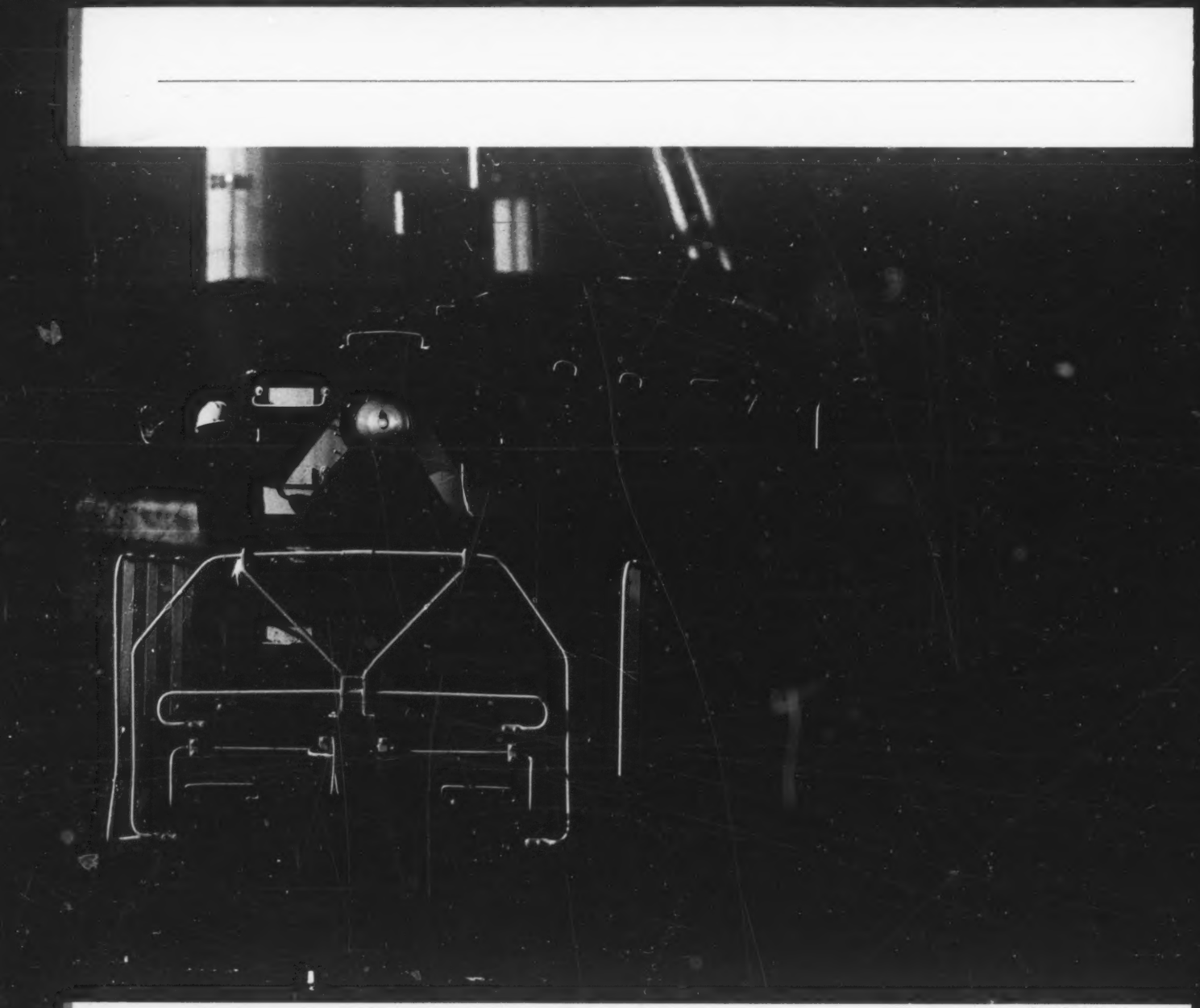
as a percent of total U.S. energy increased to 36.2 percent in 1986, up from 32.3 percent in 1980. The price of electricity remains relatively stable, averaging about 6.8 cents per kilowatt hour in 1987, compared to 6.7 cents in 1986. In real terms the price is expected to decline through 1995. Lower interest rates, declining fuel costs, tax reform-related rate reductions, smaller construction programs, and lower capacity margins are contributing to this trend.

Companies are marketing aggressively, designing innovative rates to attract and retain load, competing for market share, testing flexible pricing, and maximizing resources through sales and leasebacks and through restructuring. Interest in diversification remains strong. About 73 percent of companies surveyed by EEI last year are diversified, the same percentage reported in 1984. The principal areas of diversification are utility-related, such as fuel exploration and development. Companies also are implementing programs to contain costs and enhance productivity, such as load management and least cost planning.

Greater earnings stability also is aiding companies to be competitive. Increased sales led to an estimated increase in electric utility operating income of 5.7 percent in 1987. However, disallowances on new plants caused difficulties in carrying the increased income to the bottom line. The reduction in AFUDC income of 20 percent compared to 1986 also lowered earnings. Thus, earnings per share were down an estimated 3.1 percent. Yet the quality of earnings continues to improve. AFUDC as a percentage of income was 29.5 percent in 1987, compared to 36.9 percent in 1986. This positive performance was somewhat offset by phase-in plan accruals, which amounted to slightly more than 10 percent of net income in 1987.

Along with the quality of earnings, internal cash flow as a percentage of cash construction expenditures has increased to an estimated 70 percent in 1987 from about 65 percent in 1986. This result would have been stronger had the Tax Reform Act of 1986 not caused a cash flow reduction that we conservatively estimate at somewhere between 10 and 15 percent.

You are seeing the impacts of write-offs and some earnings accruals in companies' financial statements resulting from the Financial Accounting Standards Board (FASB) amendments to Statement #71 on phase-ins, abandonments, and disallowances. The issue of how to account for the discontinuance of the application of Statement #71, once a company has determined it no longer meets the criteria of the Statement, is being considered by the FASB. The essential question electric utilities and their auditors must ask when preparing financial statements is whether they continue to meet the criteria. EEI strongly believes that accounting standards



Robert Rathe / Folio, Inc.

Reforming the Staggers Act is essential "to ensure fair treatment in the pricing of rail transportation for captive shippers. . ."

should recognize the economics of regulation in the financial statements of regulated companies.

Phase-ins, prudence reviews, and capacity disallowances continued to hinder the recovery of, and earnings on, investment in new facilities in 1987. However, the rebirth of federal litigation on rate matters during the year indicates federal courts may become more available to utilities as an avenue to redress adverse state regulatory decisions.

A variety of other regulatory and legislative issues affect the industry's ability to control costs, maintain financial stability, and enhance operating flexibility.

On Capitol Hill, the first session of the 100th Congress produced a number of solid achievements for the industry. These included legislation to fund a substantial new, two-year clean coal technology program for retrofits and repowering; and to restrict the use of tax-exempt bonds for attempts to take over electric power companies—thus protecting the entire industry, with the lone exception of the Long Island Lighting Company.

Effective new direction was obtained from Congress for the nuclear waste disposal program. Legislation cleared the way for a site at Yucca Mountain, Nevada, to be reviewed by the Department of Energy as a possible waste disposal location. Attempts in Congress to permit state and local governments to veto nuclear plant operation by refusing to participate in emergency preparedness were soundly defeated.

Work continues on seeking a Congressional extension for the Price-Anderson Act. In addition to a first layer of conventional insur-

ance, the legislation includes a second layer of compensation to be paid through retrospective utility premium payments. The Institute continues to support legislation that would encourage the use of standard nuclear plants and provide stability and predictability for the federal licensing process.

Acid rain legislation remains a threat, even though sulfur emissions continue to decline under existing programs and new clean coal technologies are demonstrating cost-effective results. As proposed, additional acid rain legislation would cost billions of dollars each year without ensuring a concomitant environmental benefit.

Markup on reform of the Staggers Act, essential to ensure fair treatment in the pricing of rail transportation for captive shippers, is expected in both the House and Senate next month. Also, we are alert to legislative initiatives in the tax area, particularly in the treatment of deferred taxes.

Our success in the legislative area is a reflection of our ability to demonstrate the significant impact electricity policies have on consumers' costs and on service reliability.

We will continue to meet the challenge of providing adequate, reliable, and economic electricity in a changing and increasingly competitive environment. We believe that all parties with interest in the electric utility industry, no matter how specific their concerns, must bring a broad perspective to the development of electric power policies.

Decisions made today will determine how we meet our nation's electricity needs tomorrow. Proposals for change, regardless of their source, must be put to a crucial test—could they truly create a more efficient, stable, and productive electric system? Simply creating a different system is not enough. Electricity is increasingly vital to achievement of the nation's goals in economic growth, jobs, productivity, and international competitiveness. For the sake of both customers and investors, we must be sure that change is not mistaken for progress. EP

PREPARING FOR THE COMPETITIVE (!), DEREGULATED (?) 1990s

Just when we thought the utility industry had returned to halcyon times, we realized that maybe we are just passing through the eye of the hurricane. Because of the building competitive pressures and rapid movement toward deregulation, the future of the electric power industry is more uncertain than ever.

What can planners do to prepare? Here are a few suggestions:

Recognize uncertainty. Consider alternative views of the world. Abolish "base case" thinking. Get familiar with using probabilities to express what you know (or don't know). Hedge your bets on deregulation.

Take a profit maximizing approach. Learn how to calculate profit and relate decisions to the bottom line. Think in terms of marginal costs. Use economic principals to guide reliability decisions.

Learn more about customers. What do they do with electricity? What are their alternatives? How will their needs change?

Learn about competitors. Take a regional approach. Understand competitors' cost structure. Think like the competition.

Streamline planning. Bridge the following gaps in your organization: between management and planners; between planning and implementation; between planning and operations.

Organize around information flows. "Knowledge is power" is a guiding tenet of the information age.

Use the best available tools. Increasingly, organizations will need the best information age technology to stay ahead of the competition.

With the help of industry leaders like Northeast Utilities, Niagara Mohawk, and Northern States Power, EPS is responding to the current industry imperatives by introducing a new generation of planning tools:

- MultiArea LMSTM: a level playing field for estimating the profitability of all supply and demand options.
- POLARIS: a detailed supply planning tool that meets the needs of both power system operators and planners. Its realistic hour-by-hour simulation approach improves professional productivity and credibility.
- GEMINI: task-oriented software that facilitates coordinated, decentralized decision-making in a complex, uncertain world.

Since these tools recognize that the energy marketplace has changed, they are equally at home in a future with more or less regulation.

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Norm Rubenstein

AIDS in the Workplace

How are corporations confronting the nation's number one health crisis?

Insidious and devastating, Acquired Immune Deficiency Syndrome (AIDS) is the disease of everyone's nightmares. For some individuals in areas where the incidence of AIDS cases is high, the fear of contracting AIDS has become so crippling that support groups have formed to reassure the "worried well." A recent telephone study conducted by the Center for Work Performance at the Georgia Institute of Technology reports that thirty to forty percent of the workers they surveyed are afraid of catching AIDS in the workplace.

Epidemiological evidence confirms those fears are irrational: AIDS is not transmitted casually—in the workplace or in any other environment. Among others, Surgeon General Everrett Koop and representatives of the Centers for Disease Control in Atlanta repeatedly have stated that intimate sexual contact with infected persons, sharing IV-drug needles, exposure to contaminated blood products, and *in utero* transmission represent the principal ways in which people contract AIDS.

With the exception of health-care workers (for whom there are published infection-control guidelines), most workers need never fear direct blood-to-blood contact with the virus that causes AIDS, a virus that is comparatively fragile and short-lived outside of the human body. Yet workers confess widespread concern of contracting the disease in public restrooms, cafeterias, and company vehicles, or from telephones, computer terminals, and water fountains.

If the fear is irrational, its existence is explained—at least in part—by the sobering statistics associated with the growing AIDS epidemic. Since 1982, when the Centers for Disease Control first established its AIDS case definition, over 53,000 cases have been reported in the United States alone. And, although high-incidence areas—New York, California, Florida, Texas, New Jersey, Illinois, Pennsylvania, Georgia, Massachusetts, and the District of Columbia—account for 80 percent of the cases, every state has reported AIDS cases to date. Of the total, almost 30,000 AIDS patients already have died from the disease. For every reported AIDS case, there may be as many as ten cases of AIDS-Related Complex (ARC), a debilitating but not always fatal condition caused by the same virus. Many specialists believe that ARC is almost inevitably a precursor of AIDS.

Because many Americans' knowledge about AIDS is limited to its coverage in the media, they often understand very little about the disease and its potential impact on their lives. And, what they do know may end up unnerving instead of reassuring them. Caused by the aptly-named human immunodeficiency virus (HIV), AIDS compromises and then destroys the body's immune system. Unable to ward off unusual infections and cancers, the patient generally succumbs within eighteen to twenty-four months of diagnosis. Moreover, individuals can be infected with the virus for years without manifesting symptoms, and estimates place the number of individuals already infected in this country somewhere between one and two million. World-wide estimates of ten million are not uncommon. One scenario predicts between two and three hundred thousand cases in the United States by the early 1990s. With neither a vaccine nor a cure in sight, the epidemic is a reality with which everyone—not just AIDS patients—will have to learn to live.

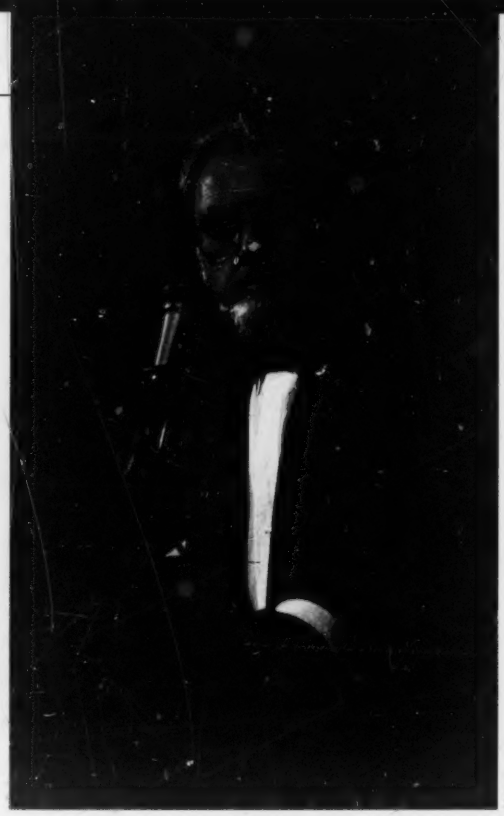
Norm Rubenstein is director of the Information & Publishing Services department at Edison Electric Institute. He also serves on the steering committee of the Whitman-Walker clinic, a non-profit health services and education organization located in Washington, DC.

AIDS as a Workplace Issue

As the number of individuals with AIDS and ARC in this country grows, more and more Americans inevitably will confront the disease face-to-face for the first time—and, for many of them, that confrontation will occur in the workplace. Thus, corporations increasingly will see the direct impact of AIDS and ARC on workers with the disease or on those who must learn to accomodate its existence in the workplace. For all evidence seems to suggest that, under most circumstances, AIDS and ARC patients pose no danger to their workplace colleagues, but they do derive tremendous benefits from continuing to work as long as they are well enough to do so productively. And, while the legal issues associated with AIDS are complex and continually evolving, some precedents exist for treating AIDS as a handicap and

"Offices, factories, and other work sites should have a plan in operation for the education of the work force and accommodation of AIDS and ARC patients before the first such case appears at the work site."—Surgeon General C. Everett Koop

Mark S. Reinstein/Unphoto



Allstate

Elizabeth Taylor, national chair of The American Foundation for AIDS Research, testifies before Congress. Surgeon General Dr. C. Everett Koop addresses the "AIDS: Corporate America Responds" conference.

protecting its victims from discrimination and from invasions of their privacy. (See the Regulatory Review column in this issue.)

Clearly, all businesses have a vested interest in minimizing the toll—both human and economic—that AIDS and ARC can take. In fact, a number of major U.S. corporations—including several electric utilities—have already discovered that the AIDS issue, if actively and properly managed, can combine humane policy and good business sense to everyone's benefit. How that goal should be accomplished, however, is a subject of greater debate, influenced by factors as wide-ranging as morality, geography, and experience with the issue itself.

In several high-incidence areas—San Francisco is the best example—corporations saw the potential impacts of AIDS and ARC on their operations in the early 1980s and moved aggressively to address the issue. Companies like Levi Strauss and Bank of America recognized that dealing with AIDS in the workplace meant not just anticipating and diffusing the panic that the first AIDS patients initially would create, but also helping those directly affected with the disease confront the worst challenge of their young lives. On one hand, it was an issue of corporate responsibility to the worker; on the other, it was an emerging corporate challenge to minimize the economic costs associated with the AIDS epidemic that, ultimately, could affect shareholders, customers, and the viability of the corporation itself.

That challenge produced, among other things, a consensus among several San Francisco businesses that structured AIDS programs—including workplace guidelines for supervisors, educational materials and presentations for employees, and clear statements of the company's policies—were the most effective way to address the problem. It also produced one of the first symposia on AIDS in the Workplace, which was sponsored by the Business Leadership Task Force of the Bay Area (BLTF) in March of 1986. The BLTF, a consortium of seven major Northern California businesses—Levi Strauss, Pacific Telesis, Merwyn's, Bank of America, Wells Fargo, AT&T, and Chevron—emerged in 1985 to provide technical and financial support for the development of educational materials focusing on AIDS as a workplace issue. BLTF grants to the San Francisco AIDS Foundation produced a variety of materials including a workplace policy guide and an educational videotape to help other organizations "deal with the AIDS epidemic in ways that are responsible and economically feasible, and which affirm life." The underlying message, however, was clear: having a policy in place before the first incidence of AIDS in the workplace could minimize some of the potential disruptions often associated with the disease.

Allstate and *Fortune* Probe Corporate Attitudes

In the time that elapsed between the BLTF conference and one that Allstate Insurance sponsored in October of 1987 in Chicago called

"AIDS: Corporate America Responds," two factors altered dramatically: the rising incidence of AIDS and ARC cases in the workplace reflected the spread of the disease, and the degree of corporate interest in the subject mirrored the growth in cases.

Executives from over 200 major U.S. corporations and non-profit organizations—including five investor-owned utilities—attended the Allstate forum, reflecting the degree to which AIDS in the workplace had become a universal concern. They listened to speakers like Surgeon General Koop and Allstate Chairman and CEO Richard Haayen, and they formed working task forces. These task forces were charged with recommending how various components of a corporate entity—its legal, medical, corporate communications, human resources, legislative affairs, and corporate philanthropy departments—could collaborate in the creation of a sound and effective AIDS/workplace strategy. These reports were made available at a January 1988 conference in Washington, DC, and timed to coincide with the publication of survey results from a twelve-page questionnaire that Allstate and *Fortune* Magazine mailed to over 2000 U.S companies "to measure the extent to which companies are concerned about AIDS and to [identify] the policies that companies are following and developing to cope with the AIDS problem."

The *Fortune* survey results are interesting because they reflect how senior managers of many American corporations view the AIDS issue. They are alarming in that they confirm how few to date have addressed the issue in any serious way. Of the more than 2000 surveys mailed, 623 companies responded, and of those responses, two-thirds were completed by top management. Significantly, AIDS was defined as one of the ten priority issues facing the nation today—behind only the Federal deficit and drug abuse. (See Table 1.) For these executives, the two principal reasons for establishing an AIDS policy/workplace program would be an actual experience with AIDS in their workforce, or demonstrable impacts from AIDS or ARC in the workplace on the company's bottom line. Rising insurance costs or declining company morale and/or productivity exemplify the kind of impacts that might mobilize a management response.

And, in fact, 29 percent of the companies who responded reported having an AIDS policy or one in development; ten percent have written policies. The majority of the responding companies, however—71 percent, in fact—neither have a policy nor plan to implement one, despite the fact that 17 percent of all respondents reported prior experience with AIDS cases in their workforces, and 80 percent believe that AIDS will cause costs—particularly insurance costs—to increase and perhaps even require benefit-package modifications. Alarmingly, 20 percent of the *Fortune* survey respondents indicated they would take some form of negative action—including possible dismissal—against individuals known to have AIDS.

The *Fortune* survey evidences not only the shared concern but also the differing attitudes of U.S. corporate executives about AIDS and its potential impact on their companies. The perspective that emerges in the Allstate task force reports, compiled in the publication, *AIDS: Corporate America Responds*, not only is more consistent, it is more pro-

Table 1

Which of These are the Biggest Problems Facing the United States Today?

	Total (623)
Federal deficit	81%
Drug abuse	56
AIDS	45
Negative balance of payments	40
Environmental pollution	21
Threat of recession	20
Threat of nuclear war	10
The homeless	7
Unemployment	4
Teenage suicide	3

*The respondents were asked to identify the nation's three biggest problems from a list provided.

Source: *Business Response to AIDS: A National Survey of U.S. Companies*, sponsored by *Fortune* Magazine and Allstate Insurance, 1988, p. 15.

PACIFIC GAS AND ELECTRIC COMPANY POLICY STATEMENT AND GUIDELINES ON AIDS IN THE WORKPLACE

As a resource for companies now developing policies or procedures on AIDS, the Allstate Forum on Public Issues published three actual corporate AIDS policies as an appendix to *AIDS: Corporate America Responds*. One was Pacific Gas and Electric Company's policy, reprinted below.

▼ ▼ ▼ ▼ ▼

In keeping with two of our corporate objectives to ensure a safe, healthy work environment for our employees and the public we serve, and to prohibit all forms of arbitrary discrimination in employment, we have developed the following policy statement and guidelines on how to handle personnel matters related to employees afflicted with AIDS. The policy statement and guidelines are based on the most current medical information on this subject available. If any significant medical developments occur, we will revise the statement and these guidelines accordingly.

Policy Statement

It is PGandE's position that employees afflicted with AIDS do not present a health risk to other employees in the workplace under normal working conditions. Employees with AIDS are subject to the same working conditions and performance requirements as any other employee. However, if there is supervisory concern that an employee with AIDS is not able to perform assigned duties, a medical clarification examination may be required to determine the employee's fitness for work. Lastly, employees with AIDS, provided that they are otherwise eligible, are entitled to coverage under the company's sick leave, medical leave of absence, disability benefits and equal employment opportunity policies.

Guidelines

1. Employees afflicted with AIDS should be treated the same as any other company employee. However, if their medical or physical condition affects their ability to perform their assigned duties, they should be treated as any other employees who have a disability that prevents them performing the duties of their job.

2. If a supervisor has a reasonable basis to believe that an employee with AIDS is unable to perform the duties of his/her position, the supervisor must request the employee undergo a medical clarification examination. The results of the medical clarification examination shall guide future personnel decisions affecting the employee.

3. Employees afflicted with AIDS, to the extent they are eligible, are entitled to coverage under the company's sick leave, medical leave of absence, disability benefits and equal employment opportunity policies. When requested, supervisors and personnel department representatives should furnish information regarding those policies to affected employees.

4. If employees who share the same work environment with an employee with AIDS express concerns over their personal safety and health, supervisors must explain that, based on guidelines issued by the United States Public Health Service and expert medical opinions, casual contact with a co-worker with AIDS poses no threat of transmission. If necessary, supervisors should contact an appropriate EAP counsellor to arrange for more comprehensive education efforts for the work force.

gressive and more supportive of individuals with AIDS and ARC, of their right to continue working, and of workplace strategies to reduce the fear and disruption they initially may prompt. But that is hardly a surprise. Not only did the task forces draw on the corporate support and expertise of companies already known for their commitment to AIDS education and workplace policies, they also reflected the input of national AIDS organizations already on record as endorsing workplace education programs and codified policies.

How Utilities Are Meeting the Challenge

Many electric utility companies individually have confronted the issue of AIDS in the workplace and determined whether and what kind of programs to implement for their employees. Thus, it is not surprising that several committees of Edison Electric Institute (EEI), the national association of investor-owned electric utilities, already have addressed the issue of AIDS at industry conferences. In November 1985, the Physicians' Task Force of the Safety and Industrial Health Committee affirmed the right of infected persons to work if they are physically able to perform their jobs and if they are not adversely affected by the work environment. The Task Force report on AIDS reiterated that "there are *no* known cases in which AIDS was transmitted through casual contact in a work environment." It did, however, question whether "writing a procedure for this disease and not other infectious diseases may be discriminatory." At a 1987 conference, the Affirmative Action Committee also addressed the AIDS issue, but produced no written recommendations. And, in May of 1988, the Labor Relations

Bill Kelley Unphoto

Committee is scheduled to hear an AIDS presentation, as is the Safety and Industrial Health Committee, which has arranged for a speaker from the Centers for Disease Control.

In addition to the forum that the EEI committee structure provides, EEI members turn to informal networking when they are anxious to obtain information about how other companies have designed their AIDS/workplace programs. In some companies, human resource departments or Employee Assistance Programs manage the company's AIDS information/support activities. In others, it's the corporate medical staff or the personnel division. While the nature and administration of these programs varies considerably among those electric utilities contacted for this article about their AIDS/workplace strategies, a common intent seems to inform them all—a desire to enlighten the workforce and to reduce the negative impacts—emotional and economic—that AIDS and fear of the disease often produces.

One woman experienced in answering other utilities' questions about AIDS-related education and employee assistance programs is Carol Lee, a Pacific Gas and Electric Company (PGandE) Employee Assistance Program (EAP) Counselor. When Lee discusses PGandE's active role in addressing the issues of AIDS and ARC in the workplace, she is describing one of the nation's most frequently imitated and respected AIDS/workplace programs, not to mention one of the earliest. In the initial publications of the Business Leadership Task Force of the Bay Area and in *AIDS: Corporate America Responds,* the PGandE AIDS policy is reprinted for the benefit of companies just beginning to contemplate AIDS workplace policies and programs. Interestingly, the PGandE program, which was begun in 1983, was designed to reassure PGandE service workers who feared contracting AIDS in the

Chris Cross/Unphoto

Although research indicates AIDS poses no danger at most work sites, some workers still fear exposure to HIV from shared office equipment or company cafeterias. Company-sponsored education programs can help ally those fears.

homes of some customers. To assuage their fears about casual contact with HIV-infected individuals or with AIDS patients, PGandE developed a three-step approach to educating its workforce about AIDS involving "communication, education, and keeping current." Successful in reducing fear and changing misconceptions of how AIDS is transmitted, it also has served, according to Lee, "to replace fear and panic with sensitivity and concern for employees who have contracted AIDS/ARC."

Lee describes the extensive AIDS education program that Employee Assistance administers as "not

CRITICAL ISSUES

Although they do not propose "solutions to these problems," John Bunker, Michael Eriksen, and Jennifer Kinsey have identified the critical issues that each company planning a corporate AIDS strategy should address in light of its own "unique culture and characteristics. . . ." Their list, which appeared first in "AIDS In the Workplace: The Role of EAPs," is reprinted with permission from the September 1987 issue of *The ALMACAN*.

Leadership—Who will manage and direct the AIDS program? Top management must be committed to providing the resources and leadership for a comprehensive policy and educational program. One especially compassionate example is Robert Haas, CEO, Levi Strauss & Co., who recently helped staff a booth, personally distributed AIDS program materials, and provided leadership to other corporations in San Francisco.

Legal—What local, state and federal laws must be taken into consideration when dealing with AIDS? In state legislations, about 500 bills involving AIDS have been introduced this year, more than any other subject. Potential liability concerns of employee confidentiality and privacy, testing for antibodies to the AIDS virus, and common-law duty to provide a safe workplace.

HIV Testing—Should HIV testing be considered for preemployment physicals and as a condition of employment? Who will test employees? What will be done with the test results? How will confidentiality and privacy be maintained? What about the concern of false positive test results? What legal and liability issues need to be addressed before, during and after testing employees? Is testing a cost-effective allocation of resources? Is testing voluntary or mandatory?

Benefits—Are current health, disability and life insurance plans adequate to deal with AIDS cases? What kinds of alternative health care will or could benefit plans cover (home health care and hospice)? The medical case management approach provides coverage that includes palliative or supportive services designed to maximize an individual's functional level and independence.

AIDS Policy—Should there an an informal or formal corporate AIDS policy? Unambiguous guidelines for human resource personnel and line managers enhance the probability that AIDS-related events are handled equitably throughout a company. A manager needs to know what to do when an employee informs a supervisor of an AIDS, ARC, or HIV positive diagnosis.

Public Relations—How will the corporation deal with the media, coworkers, stockholders and the public when the initial AIDS-related case occurs? What is the company's position on disability, sick leave, and return to work for the employee with AIDS? A positive and proactive approach to this public relations situation requires careful consideration to avoid a very negative corporate image. Many corporations are actively involved in community AIDS education and service projects which enhance company visibility on this important health issue.

Education—What AIDS educational materials will be utilized and who will provide the education? AIDS educational programs require careful planning to address sensitive issues including the nature of the disease, the distinction between AIDS and HIV infection, the methods of transmission, the discussion of safe sex practices, and the lack of risks in the workplace. Businesses should design and implement programs based upon an educational needs assessment of their employees knowledge and attitudes regarding AIDS. Finally, does the company have the resources and personnel to plan and conduct an effective AIDS education program?

Consultants—Should outside consultants be utilized to help design, plan, and implement AIDS policy and educational programs? Businesses must assess internal needs and resources, then determine what information and resources they need to develop a comprehensive program. We recommend contacting businesses that have instituted AIDS policy and education programs, reviewing the resources cited in this article, and soliciting the advice of public health officials in local, state and federal agencies. Private sector consultants may provide expertise to assist corporations in developing AIDS programs; however, they should be carefully screened on several criteria: documented experience with previous corporate clients, academic training in public health education, and specific AIDS-related program activities.

Employee Relations—How do managers respond to a group of workers who refuse to work with a person with AIDS, ARC, or HIV infection? What happens when customers complain that they are concerned about a rumor that an employee in your firm has AIDS? How and when does a manager confront an employee who makes inappropriate, callous remarks about a fellow employee with AIDS?

Jon Feingersh - Uniphoto

Federal support for AIDS research is expected to total about $450 million in 1988, up from $250 million in 1987.

mandatory, but strongly recommended." It includes a one-hour formal presentation by Employee Assistance Program staff, which, in addition to an administrator, includes psychologists, social workers, counselors, and consultants. That presentation incorporates a videotape prepared by PGandE's EAP with the technical assistance of Dr. Paul Volberding, a national AIDS expert and a consultant to PGandE. Volberding also addressed PGandE employees at one of two noon-time presentations about AIDS that EAP sponsored last year. Another videotape that EAP often uses to educate its workers is *An Epidemic of Fear,* which focuses on AIDS and workplace concerns. Featuring Dr. Constance Wofsy, another PGandE consultant and noted AIDS specialist, the film is another product of the San Francisco AIDS Foundation *AIDS in the Workplace* educational series. Wofsy also appeared at PGandE to answer employees' questions at the second noon-time presentation. In addition to the public speakers, videotape showings, and Q&A sessions arranged by EAP staff, PGandE employees also receive literature about AIDS as part of the company's goal of educating the workforce and keeping it well-informed. Additionally, EAP human resource personnel staff an AIDS hotline and, in order to insure the currency of the information it provides, EAP downloads AIDS information directly from an online information service provided by the Centers for Disease Control.

PGandE's program is as extensive a corporate AIDS education and support effort as can be found at an investor-owned electric utility, reflecting, in Lee's words, "the magnitude of the problem." A study that PGandE conducted in July of last year confirmed 14 cases of AIDS in the PGandE workforce and 140 ARC cases since 1985. (Consolidated Edison Company of N.Y. [ConEd], located in the high-incidence area of Manhattan, reports "roughly a half dozen or so AIDS cases so far.") Projecting to 1992, PGandE expects that 175 of its employees will have been diagnosed with confirmed cases of AIDS, and by 1997, that number will reach 455.

The study also indicated that by 1992, the cost of accrued sick-leave benefits for each AIDS patient would reach $7,000; long-term disability $27,800; and estimated annual health care costs would be $76,800 per patient. The bottom line: an estimated $4.3 million per year in AIDS-related costs. And these are direct costs. There is also the issue of declining productivity from reduced effectiveness and/or absenteeism, both on the part of individuals with AIDS and ARC and their care providers or their workplace colleagues, for whom fear and grief can be expected to exact a significant toll.

And, for companies like PGandE or Florida Power & Light Company

(FP&L) who self-insure, there can be increased administrative costs (not to mention health and life insurance premiums), as well as rising costs associated with AIDS education and support activities themselves. Of 88 companies that responded to the last EEI Compensation and Benefits Committee survey, 53 self-insure. Companies who self-insure can elect to handle their own administrative responsibilties or to retain a third-party administrator. Regardless of their choice, the attraction of self-insuring is that, under normal circumstances, the cost-savings can be significant. Clearly, AIDS and ARC claims not only increase health coverage costs dramatically, they also intensify the burden of their administration. While most companies don't face the workforce threat that AIDS poses to PGandE by virtue of its location in one the cities with the highest incidence of AIDS cases, the health care and related benefits costs they will experience will increase with each case of AIDS or ARC.

For Lee and her colleagues, the answer lies in educating the workforce to protect itself from infection and in assisting employees with serious medical problems in the management of their cases. With chronic illnesses like AIDS, repeated hospitalizations are the rule. In cases where hospice care, for example, can both reduce health care costs and enhance the patient's attitude and sense of well-being, the benefits accrue to everyone.

The subjects that, by definition, must be addressed in any AIDS-education program include topics and issues about which many people have strong moral or religious convictions. How do PGandE employees react to the EAP-sponsored AIDS education activities? Lee gets

Paul Conklin/Unophoto

the full gamut of reactions—from embarrassment and misguided anger to requests for additional information about safer sexual practices. Her advice to those initiating programs like the PGandE AIDS/workplace model: don't try to change personal beliefs; try to integrate factual information.

Another enthusiastic utility AIDS educator is Donnie Braswell, Florida Power & Light's Corporate Nurse. For the past three years Braswell has been a one-woman AIDS/workplace education and support system for her company. A Ph.D. candidate with 25 years of critical care experience, she travels to FP&L facilities when she is invited to speak about AIDS, conducting informal question-and-answer programs. They ask many of the usual questions—about mosquitos, about kissing, about saliva—and Braswell answers in the vernacular of her audiences. She talks to all echelons—vice presidents, plant managers, union people—who want information. At one recent presentation, she educated close to 1000 employees in four group sessions.

FP&L has completed one mailing of a cartoon type AIDS-information pamphlet to its employees, and of course when she speaks, Braswell supplies additional literature for employees to take home to use in educating their children. Educating children is one of Braswell's key concerns in fighting the AIDS epidemic.

FP&L has no written AIDS policy, but not having a written policy doesn't mean not addressing the issue, and Braswell confesses that AIDS education and support occupy an increasingly large part of her time. FP&L self-insures, so Braswell is, in effect, the "case manager" for any AIDS-related illness a FP&L employee or dependent may develop. Her reward: "helping someone in a crisis situation. Education is the only way we're going to survive—and that includes cancer, coronary artery disease, and, of course, AIDS."

Anthony Macerollo, Manager of Human Resources at Potomac Electric Power Company (PEPCO) in Washington, DC, explained that PEPCO's decision not to issue a separate AIDS policy was intentional, the consensus of a 1985 Task Force with representatives from the company's Labor Relations, Legal, Communication, and Medical departments. The Task Force concluded that AIDS was an illness like any other and, because it was covered within the company's benefits structure, a separate written policy would only fuel hysteria instead of calm it. As Macerollo explains, "We wouldn't do a policy on hepatitis or other diseases." His comment echoes that of ConEd's Dr. Tom Doyle, who noted that he didn't "have a policy on TB or other infectious diseases," or Public Service Electric and Gas Company's Dr. Bernie Reilly, who treats AIDS as a medical/disability problem and doesn't separate it from other serious or life-threatening illnesses.

To help their employees put AIDS "in perspective," PEPCO developed a videotape, which was

shown to all employees last June and currently is shown to new hires. The tape evolved from five sessions that Macerolla, a physician, and an attorney conducted with 200 PEPCO managers. It featured Dr. Wayne Greaves, a Howard University AIDS specialist, and reflected the input of the PEPCO Corporate Affairs staff. At the time that the video was shown initially, employees received a packet containing a copy of the *Surgeon General's Report on Acquired Immune Deficiency Syndrome*, several Red Cross pamphlets, and a questionnaire that enabled individuals to ask personal questions they might not have voiced in group sessions. Generic questions—"Can mosquitos transmit AIDS?"—will be addressed in a forthcoming issue of the company newspaper, but confidential matters merited personal phone calls from PEPCO's Corporate Physician, Dr. William I. Bauer.

Like Braswell and Lee, Macerolla sees education as critical to an effective AIDS/workplace strategy—education, compassion, and confidentiality. PEPCO, like FP&L and many other utilities, doesn't discuss whether or not it has any AIDS cases because, as Macerolla points out, if he disclosed that information, it might lead to conjecture about who had the disease. He emphasizes the need for companies to respect the confidentiality of their workers, whose privacy is protected by law.

Detroit Edison's Richard Thomas, Manager of Personnel Services, recently mailed a booklet about AIDS to all Detroit Edison employees' homes. The publication, *AIDS: Are You at Risk?*, was first sent to all supervisors. According

AIDS IN THE WORKPLACE RESOURCES

The following is a list of resources providing further information about the AIDS/ARC/HIV epidemic and its effect on the workplace. It is adapted with permission from the September 1987 issue of *The ALMACAN*.

Articles

Aberth J., "AIDS: The Human Element," *Personnel Journal*, pp 119–123, August 1986.

Bunker, J., Eriksen, M., and Kinsey, J., "AIDS in the Workplace: The Role of EAPs," *The ALMACAN*, pp 18–26, September 1987.

Halcrow A., "AIDS: The Corporate Response," *Personnel Journal*, pp 123–127, August 1986.

Isler, C., "AIDS in the Workplace," *Medical Aspects of Human Sexuality*, pp 60–64, May 1986.

Krueger, G., "Helping the Employee With ARC or AIDS," *The ALMACAN*, pp 28–31, September 1987.

Rowe M., Russell-Einborn M., and Baker, M., "The Fear of AIDS," *Harvard Business Review*, pp 28–36, July-August 1986.

Singer I., "AIDS in the Workplace," *Nations Business*, pp 36–39, August 1987.

Reports and Training Materials

AIDS and the Employer: Guidelines on the Management of AIDS in the Workplace, The NY Business Group on Health Inc., 622 3rd Ave., 34th Floor, N.Y., NY 10017, (212) 808-0550.

AIDS: Corporate America Responds, Allstate Consumer Information Center, Allstate Insurance Company, Attention: Public Issues Department 10316, P.O. Box 7660, Mt. Prospect, IL 60056-9961. (Single copies are free when the request is submitted on corporate letterhead; multiple copies are $4./each.) A videotape summarizing the six reports contained in *AIDS: Corporate America Responds* can be obtained by writing to Duplicating Plus, 214 W. Ohio St., Chicago, IL 60610. (Available in either VHS or Beta format, the tapes cost $12./each.)

AIDS: Employer Rights and Responsibilities, Commerce Clearing House Inc., 4025 W. Patterson Ave., Chicago, IL 60646.

AIDS in the Workplace, The Bureau of National Affairs, Inc., BNA Customer Service, 9435 Key West Avenue, Rockville, MD 20852, (800) 352-1400 in Maryland, (800) 372-1033.

AIDS in the Workplace Package, San Francisco AIDS Foundation, 333 Valencia St., San Francisco, CA 94103, (415) 864-4376.

AIDS Legal Guide: A Professional Resource on AIDS-Related Legal Issues and Discriminations, Lambda Legal Defense and Education Fund Inc., 1322 West 43rd Street, N.Y., NY 10036, (212) 944-9488.

Business Response to AIDS: A National Survey of U.S. Companies (1988), sponsored by *Fortune* Magazine and Allstate Insurance. A free copy of a summary of the survey is available from Dr. Merle Sprinzer, *Fortune* Magazine, 1271 Avenue of the Americas, Room 1554, New York, NY 10020.

Managing AIDS in the Workplace, (AIDS Executive Briefing and Training Package) Workplace Health Communications Corporation, 4 Madison Place, Albany, NY 12202, (800) 334-4911 in N.Y., (800) 942-1002.

to Thomas, Detroit Edison's is "not exactly a written policy," but "it treats AIDS no differently than it does other illnesses." With no reported cases to date, Thomas anticipates that the first confirmed case is just a matter of time: since the composition of Detroit Edison's workforce reflects that of the general population, there inevitably will be some individuals at risk in that workforce.

Thomas and his company are the beneficiaries of an active public AIDS education campaign in Michigan, not unlike those conducted in San Francisco that help inform the local population. In addition to the booklet, AIDS was discussed in the company newsletter, and individuals who want to view it can see the *AIDS in the Workplace* film in which Constance Wofsy and representatives from Levi Strauss, Bank of America, and other BLTF corporations discuss AIDS in a workplace context.

In the case of each of these utility AIDS education/workplace programs, the corporation has accepted its responsibility and responded to workers with AIDS or ARC and to their workforce colleagues with information, compassion, discretion, and fairness. A policy about how to treat individuals manifesting HIV-induced illness and how to reduce the anxiety their presence in the workforce may cause is essential in light of the epidemic nature of the disease. None of these utilities have erred in judgment in the way that significant numbers of the *Fortune* survey respondents might. All have acknowledged the AIDS patient's right to work as long as possible and the lack of danger he or she represents to co-workers. All have, by educating the workforce to better understand the disease and its victims, reduced the chance that discriminatory behavior will invite expensive and demoralizing litigation. All, apparently, have created policies or programs that reflect and suit their corporate cultures, their local environments, and their workers' demonstrated needs. EP

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Building Teams That Work

Facilitative leadership builds on the premise that the best leaders are those who most effectively promote and sustain productive teams.

Picture for a moment a "Great Leader" in action—Washington crossing the Delaware. The General alone rivets our attention, standing at the bow of the boat, braving the elements to shape the destiny of a new country through the strength of his spirit and vision. He appears aloof, self-assured and self-contained, capable of moving armies and creating nations through the force of his own personality.

Great moments in history come to us this way—with only the "Hero" in focus. We seldom stop to think about the guys at the oars. But, had we been on that historic voyage, odds are we would have wanted to say, "Sit down, you're rocking the boat." Practical, if not inspiring, advice.

The notion that individuals alone—no matter how great—determine the course of armies, nations, and industry is naturally appealing. This image provides a romantic contrast to the way work actually gets done.

Imagine that, as Operations Director, you are responsible for moving your company across the Delaware River. First step, top management schedules a two-day executive meeting for officers to discuss the overall implications of the move for company operations and to devise a corporate strategy for the move. (Since you are just the Operations Director, not an officer, you do not attend this meeting—in spite of the fact that you will be responsible for implementing any executive decisions.)

"Facilitative leadership" is one of several management models organizations across the country are using to improve their performance. To help managers in investor-owned electric utilities learn more about what these models may offer their companies, *Electric Perspectives* plans to publish an occasional series on them. This article is the first in that series. Suggestions for other articles are welcome.—*Editor.*

There are rounds of discussions and working sessions with Finance staff to examine all the cost factors and to project the impact on budgets over the next three years. A series of meetings with department directors must be scheduled so that they can argue among themselves about the relative importance of each department and the consequent allocation of window offices in the new building.

You assemble four task forces to address major logistical issues; these groups immediately set about developing contradictory priorities. Your staff have to locate and talk to moving firms, insurance agents, packers, etc., and all your managers simultaneously have critical questions that require your attention. You decide to implement weekly progress meetings, but your staff complain that the meetings themselves are getting in the way of progress.

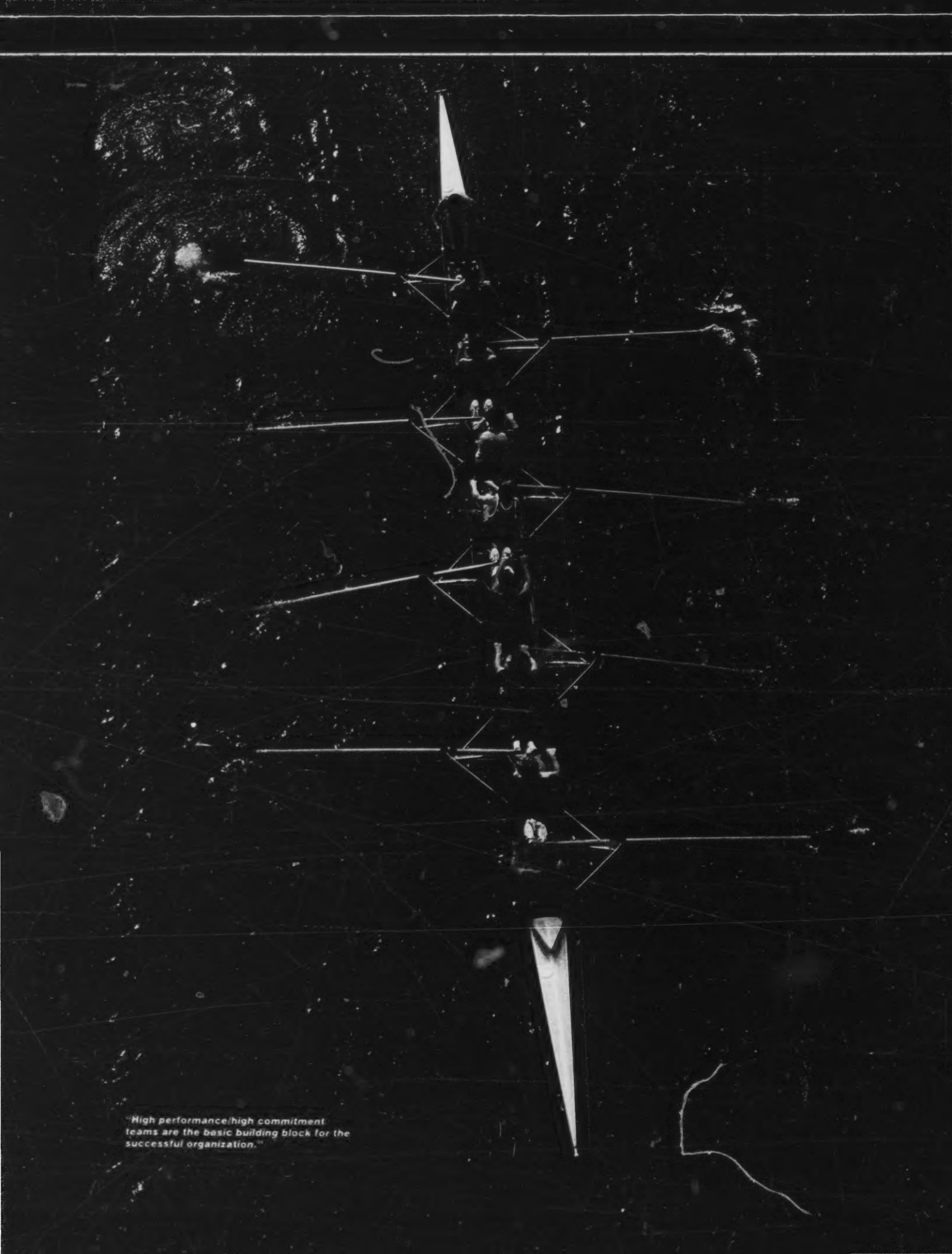
Crossing the Delaware (like implementing any corporate change) involves teamwork. All companies are made up of teams—from the officer's group to the secretarial pool and everywhere in between. Even the greatest corporate leaders accomplish little on their own, without the participation and commitment of others on the team.

High performance/high commitment teams are the basic building block for the successful organization. Teams working together in meetings become the primary instrument of organizational renewal and reinvention. They plan, negotiate, solve problems, and cooperate across organizational boundaries. In fact, a company's teams are a microcosm of the company itself. Improving the team/meeting culture—by making it more open, honest, participative, creative, and results-oriented—can produce a positive ripple effect throughout an organization.

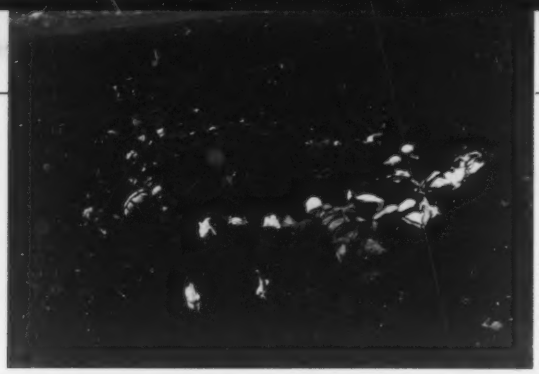
Facilitative leadership—a management model developed by Interaction Associates, Inc.—can play a crucial role in the success of high performance teams. The approach is based on the premise that the best leaders at all levels of a company are those individuals who are most effective at promoting and sustaining productive teams. The facilitative leader not only sets the tone and initial direction for any team, but also creates a supportive environment that allows team members

Mark Reynolds is a project manager with University Research Corporation, a Maryland-based professional services firm. He writes frequently on human resource management and on the electric utility industry.

Stacy Pick / Ungholo



"High performance/high commitment teams are the basic building block for the successful organization."



Jerry Irwin/Unigphoto

"Whether the team includes two or two thousand participants, productivity requires preparation."

to contribute openly and work collaboratively.

Contrast that model with stereotypical notions of the boss—the person who calls all the shots and expects agreement (and little else) from subordinates. In this traditional model, decisions are made in the upper echelons, and communication occurs only from the top down. Commitment to executive decisions and corporate priorities diminishes proportionately throughout the lower rungs of the corporate ladder, where decisions must be implemented and goals achieved. Staff feel little personal commitment to decisions when they have no role in the decision-making process.

To secure their commitment to corporate goals and to enhance motivation, employees must be more involved. This requires leaders who are willing to share information, decision making, and responsibility—leaders who facilitate successful teamwork.

The Facilitative Leader

The facilitative leader consciously develops employees and instills in them a commitment to make the changes required for continuous improvement. These leaders firmly believe that people are creative and that, by working together, teams can achieve positive results. Facilitative leaders view themselves as allies, not as adversaries; they recognize the importance of participation by the team and the value of consensus as a means of achieving commitment.

David Straus, chief executive officer of Interaction Associates, maintains that many companies have depended too much on new technologies as the means of ensuring corporate success and not enough on teamwork: "People, not machines, are the key resource of every organization. Our research shows that the highest proportion of entrepreneurial accomplishments are found in companies that value employee pride, commitment, and collaboration."

The goal of facilitative leadership is quality results through the maximum *appropriate* involvement of other people.Clearly, executives and managers cannot delegate their responsibility for the overall direction of their companies or departments. However, leaders are seldom responsible for every individual task or activity; rather, they provide the overall vision and then create a safe, participative environment in which their employees can translate that vision into reality. Hence, the importance of "appropriate involvement" as a concept in facilitative leadership. The manager's dilemma is, in a sense, to maintain power while encouraging full staff participation.

To help managers achieve that balance, Interaction Associates has devised a framework for facilitative leadership, a flexible system built on a series of conscious choices exercised by the facilitative leader and team members to plan for, lead, and follow up on team efforts.The concept of "conscious choices" underscores the principle that there is no right way to achieve any objective or complete any tasks. Facilitative leaders first recognize their options, examine the respective strengths and weaknesses of each (individually and within the context of the overall organization), and only then select the most appropriate approach.

The logic of this process is disarming in its simplicity—as disarming, perhaps, as the reality that few leaders actually follow it. Too often, decision makers fall back on the maxim that "this is the way

we've always done things," or leaders jump to the solution before they have gathered sufficient information about the nature of the problem. The leader's perception that he or she must make the decision, get people working, and achieve immediate results short shrifts the first step in successful team efforts—planning.

Planning for Success

Whether the team includes two or two thousand participants, productivity requires preparation. Planning means thinking through and making conscious choices about the team's purpose, the identification and roles of participants, projected outcomes, and the decision-making process that will be followed. Interaction Associates delineates a five-step process for planning team efforts and team meeting:

Identify Outcomes. If the desired end of a meeting or a team effort is not clear, chances are good that it will not be accomplished. Team leaders should ask themselves, "What do I want to accomplish by the end of this meeting? What would success look like?" The desired outcome should be stated briefly as a product (e.g., agreement on a proposed budget for 1988, a plan for clarifying the roles of engineers and purchasing agents in evaluating potential suppliers, a prioritized list of key issues, etc.). This product provides direction for developing the meeting agenda and allows participants to assess their accomplishment.

Assess the organizational context. No team operates in a vaccuum. Whether the context is the NFL or the AFL-CIO, the same principles hold. Planners must scan the environment to determine how their mission and their meeting fit into the overall scheme. From the corporate perspective, the context includes such things as external pressures, internal constraints, organizational changes, company politics, and corporate priorities. Knowing the context, leaders can make better choices about roles, outcomes, and agendas.

Identify and Involve Stakeholders. A stakeholder is any person (or group of people) responsible for a final decision, likely to be affected by the outcome, or capable of preventing implementation. Too often, leaders approach stakeholder involvement as little more than a political ploy, feigning concern for the needs of various constituent groups with no intention of actually acting on

Ira Wexler Foto Inc.

The facilitative leader strives to achieve the best possible results by obtaining the maximum appropriate involvement of others.

them. This strategy can often backfire, as a task force of a major utility discovered after six months of work on an issue involving night shift coverage. To implement the task force's solution, the Union had to agree to some changes in work rules. However, no one had considered including this important stakeholder on the task force or soliciting their input along the way. As one might imagine, the Union, feeling uninvolved in the process, refused to cooperate. Even the most powerful leaders are finding it more and more difficult to force solutions down others' throats.

The facilitative leader does not attempt to, choosing instead to shape a vision for the entire team—imagining what "success" might be for each individual or group involved. This type of stakeholder analysis and involvement helps team leaders to identify key issues at the outset and to achieve consensus and commitment throughout the team process.

Assign Roles. Team members typically share responsibility for four general functions: decision making, participating, facilitating, and recording. Agreement in advance about the key roles of participants and the process for decision making improves the efficiency and productivity of the team process—and the odds of success in achieving and implementing desired outcomes. For example, if the team lacks final decision-making authority, this should be stated at the outset. The role of the team then becomes to gather information, make suggestions, list alternatives, etc. Frustration is minimized when roles are clear and outcomes specified in advance. The team can address itself to the task and take satisfaction in the outcomes.

Plan the Agenda. Agenda planning is the process of thinking through a detailed flow of topics, process steps, and time necessary to accomplish the desired outcomes of a meeting. A detailed, concrete agenda is a road map for success. It lets team members know in advance how they can participate in the meeting and how to measure success. Planning the agenda, too, must be a collaborative process. All team members must agree on ("own") the agenda if it is to serve as a useful strategy. Agreement on the agenda can be achieved by discussing and amending it, as appropriate, at the start of the meeting or by circulating it in advance.

These planning steps apply to any meeting or team effort. Though planning requires an investment, the time and resources applied at the front end of the process pay off in the efficiency of the team and the increased predictability of the outcomes. As a rule of thumb, Interaction Associates estimates a one-to-one relationship between preparation time and meeting time.

By taking an open, collaborative approach to a problem or project, the facilitative leader empowers the team to produce a plan of action that each team member can support.

"Agreement in advance about the key roles of participants . . . improves the efficiency and productivity of the team process—and the odds of success in achieving and implementing desired outcomes."

Interactive Problem Solving

Problem solving is a vital component of most human activities and organizational tasks. Facilitative leadership employs an interactive problem-solving model that enables team members to work together productively to address issues and/or generate opportunities. Typically, there will be more than one potential solution to a company's problem and a variety of approaches to a single task. An open, collaborative approach to problem solving empowers the team to work together, resolve issues, and make quality decisions that achieve lasting results.

Teams tend to move too quickly to solutions, without a full examination of the problem they are setting out to solve. Consequently, the solution falls short or fails altogether. For example, "we need new overhead lighting in the machine shop" becomes a team's problem statement when it is really a solution statement in disguise. New overhead lighting at a cost of $300,000 was rejected by the team's management. When the team backed up and redefined the problem as "poor overhead lighting in the machine shop," they were able to examine alternative solutions such as cleaning the skylight, installing machine lights, and better maintenance on the existing overhead lights, solving the problem at a cost of $500.

As shown in Figure 1, Interaction Associates use a spatial model to distinguish between a team's "problem space" and its "solution

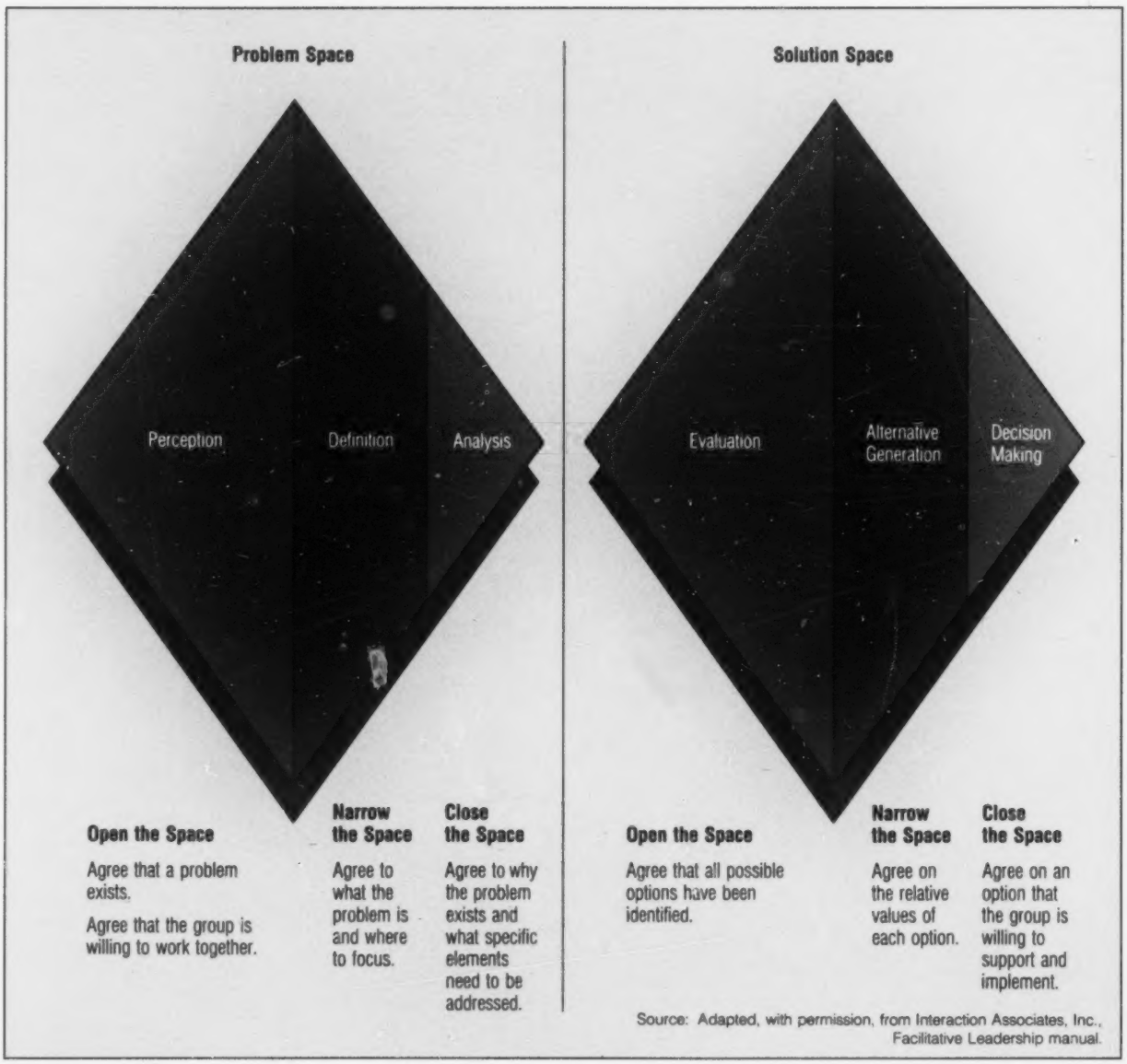
Leadership Traits
The Facilitative Leader
As an Individual
Is a good listener.
Has process savvy.
Has a positive, participative attitude.
Models facilitative behavior.
Believes that people have creative potential.
Cares that others understand the vision, direction and values—and have the information and support necessary to do their part.
As a Leader of People
Gives and solicits feedback frequently.
Shares maximum information.
Coaches—Helping others learn to think, solve problems, take responsibility.
Pushes decision making out.
Creates and maintains a safe environment.
Summarizes, organizes, categorizes.
Upholds agreements.
Leverages his/her time, energy, involvement.
As a Leader of a Unit/Organization
Is responsible for the overall vision, direction and values.
Makes sure the job gets done.
Steps back to see the big picture and to identify patterns.
Changes structures.
Pushes for continuous improvement (of quality, customer service, creativity, profitability . . .).
Actively involved in people development.
Stays in touch with the customer, employees.

Source: Adapted, with permission, from Interaction Associates, Inc., Facilitative Leadership manual.

"The emphasis here underscores the central principle of facilitative leadership—that people working together are the key to an organization's success."

Figure 1

Problem Solving Phases


Problem Space
Perception
Definition
Analysis
Open the Space
Agree that a problem exists.
Agree that the group is willing to work together.
Narrow the Space
Agree to what the problem is and where to focus.
Close the Space
Agree to why the problem exists and what specific elements need to be addressed.
Solution Space
Evaluation
Alternative Generation
Decision Making
Open the Space
Agree that all possible options have been identified.
Narrow the Space
Agree on the relative values of each option.
Close the Space
Agree on an option that the group is willing to support and implement.

Source: Adapted, with permission, from Interaction Associates, Inc., Facilitative Leadership manual.

R. Lee/Unisphoto

space." Within the problem space, the team works together to build a full understanding of all aspects and perceptions of the problem. This analysis helps the team to agree on a definition of the problem and to distinguish actual causes of the problem from apparent symptoms—a critical step in finding the right solution. Within the solution space, the team works together to identify and evaluate all possible options and to agree on the solution or solutions that everyone is willing to support.

In both the problem and solution spaces, the team moves through a process of opening, narrowing, and closing options, and reaches a series of agreements that will determine the eventual outcome of the process.

Opening the Space. In opening the space, the team seeks to generate information about the problem or potential solutions. Brainstorming is a particularly effective strategy during this phase since it allows the group to generate a variety of ideas in a short period of time. In a brainstorming session, team members agree to suspend judgment about the relative merits of points or ideas. The value of this exercise is its spontaneity, the freedom that it allows for participants to move beyond the obvious answers to more creative possibilities.

Narrowing the List. Once information has been collected and/or options generated, the team must organize and evaluate the results. In the problem space, the goal at this step is to agree on a definition of the problem and a focus for further analysis. In the solution space, the team must agree on the relative values of each option and the criteria for selection.

There are a number of strategies for narrowing the list, such as categorizing, evaluating against established criteria, ranking options. Team members should agree in advance on the tools to be used to narrow the list, but be willing to adapt or change their methods as appropriate if a planned approach is not working.

Closing the Space. A team closes the problem space when members agree on why the problem exists and which of its specific elements the solution should address. Closing the solution space, the team agrees on an option that all participants/stakeholders are willing to support and implement. The emphasis here underscores the central principle of facilitative leadership—that people working together are the key to an organization's success. Team efforts are enhanced by the facilitative leader who values people and wants to maximize their creativity and contributions. Shared ownership of decisions ensures successful implementation by building commitment and enhancing motivation.

The best team process possible will be only wasted time if little or no action occurs as a result. Action plans transform the team's agreements into a series of practical steps or specific activities for implementing those agreements. An effective action plan establishes a record of what will be done, by whom, and when; this, in turn, becomes a tool for follow-up and evaluation.

Mastering Meeting

There are over seventeen million meetings every day in the United States. Managers will spend one half of their working lives in meetings. Poor meetings and unproductive teams cost companies millions of dollars in lost revenue and profit, and they weaken employee morale and organizational cohesion.

In the late 1960s, David Straus and Michael Doyle (the co-founders of Interaction Associates, Inc.) began going to lots of meetings, literally hundreds of them, to uncover the method behind the madness of most meetings—the principles and internal structures by which individuals in groups work together to reach decisions. This early research, supported by grants from the Carnegie and Rockefeller foundations, provided the basis for the facilitative leadership model. Straus maintains that the model has succeeded because it reflects both the complexity of today's social, political, and economic climate and the basic principles of human nature. "We are experiencing a period of constant social and economic change. To succeed, organizations must reevaluate and reinvent themselves," Straus explains. "The one constant within this sea of change is people. What facilitative leadership offers are the tools to facilitate collaboration, problem solving, teamwork—the very 'human' processes critical to any organization's success."

FINANCIAL REVIEW

STOCKHOLDER ROLLS DECLINE FOR THIRD CONSECUTIVE YEAR

The number of shareholders owning electric utility stock(s) declined 1.6 percent during 1986, decreasing from 8,536,000 at the end of 1985 to 8,396,000 by the end of 1986. (See Table 1.) Shareholder reductions were widespread throughout the industry; 88 percent of all companies experienced a drop in their stockholder rolls.

An important factor underlying the downward trend is a shift in the ownership pattern of electric utility stocks. Individual investors have been moving away from utility stocks due in part to the end of the tax-deferred status of Dividend Reinvestment Programs and to investors' concerns about the threat of reduced or omitted dividends from certain utilities burdened by large construction programs. During 1986, 11 companies either omitted or reduced their dividends. These companies, as a group, experienced a 17.2 percent reduction in the number of stockholders.

At the same time, the amount and percentage of electric utility stock held by institutional investors has been steadily increasing. As of the end of 1985, stock ownership by institutional investors for the industry averaged 25.5 percent; at the end of 1986, the average grew to 30.6 percent. Institutional investors shifted to utility stocks to capture high dividends during a period of lower interest rates as well as to make profits from the purchase of stocks of certain companies whose assets were significantly reduced in value. The increased popularity of mutual funds (including industry-specific funds) and of various types of saving plans also accounts for the increase in institutional holdings.

In addition to changing ownership patterns, continued price appreciation during 1986 may have been yet another factor contributing to the decline in utility shareholders. The 19.7 percent increase in electric utility stock prices during 1986 (as measured by Moody's Electric Utility Stock Index) provided incentive for smaller investors to sell their shares and take profits.

Although year-end data are not available yet, a further reduction in shareholders is expected for 1987. As of June 30, 1987, ownership by institutional investors had increased to an average of 31.5 percent. Three utilities reduced dividends during 1987; two utilities resumed dividend payments. EP

Table 1
Electric Utility Industry Stock Ownership Significant Trends, 1983–86

	1986	1985	1984	1983
Shareholder Count[1] (thousands)	8,396	8,536	8,856	9,033
Percentage Change in Shareholders	(1.6)	(3.6)	(2.0)	3.1
Institutional Ownership[2]	30.6%	25.5%	22.8%	19.1%
Moody's Electric Utility Index	113.66	94.98	80.16	72.03
Dividend Omissions and Reductions	11	12	9	3

[1]Source: Moody's Public Utility Manual, 1987.
[2]Source: Dean Witter Reynolds, Inc., Electric Utility Industry Statistical Profile Fall 1987.

STATISTICAL REVIEW

STOCK PURCHASE PLANS RAISE $3.4 BILLION

The investor-owned electric utility industry raised $3.4 billion through stock investment plans in 1986 and $3.7 billion in 1985 according to a recent survey by Edison Electric Institute. The stock investment plans represented 16 percent of 1986 new issue capital (including debt and preferred stock financing), thereby serving as an important source of industry financing. The stock investment plans include Dividend Reinvestment Plans (DRPs) including supplemental cash contributions, Employee Stock Purchase Plans (ESPPs), Employee Stock Ownership Plans, Employee Thrift Plans, 401(k) Savings Plans, Customer Stock Purchase Plans, and Individual Retirement Accounts. The 101 companies which responded to the survey indicated that these plans helped raise 68 percent of the common equity requirements in 1985 and 73 percent in 1986.

For the second consecutive year, the total amount of proceeds raised through the various stock purchase plans has dropped. The survey notes that DRPs and ESPPs gross proceeds appear to have peaked and that significant growth only can be seen in the 401(k) Deferred Compensation Plans. A primary reason for the overall decline in popularity of the various plans is the fact that companies do not have as strong a need to raise capital through common stock as they have had historically. The administrative costs involved as well as changes in the tax law have also contributed to the decline.

Table 1.
Stock/Investment Plan Survey Results, 1982–86

	1982		1983		1984		1985		1986	
	NO.	$	NO.	$	NO.	$	NO.	$	NO.	$
Dividend Reinvestment Plans										
Companies Participating	102		105		99		87		89	
Cash Contributions ($millions)		$447		$500		$422		$655		$677
Dividend Reinvestment ($millions)		$2,207		$2,783		$2,958		$2,054		$1,797
Employee Stock Purchase Plans										
Companies Participating	46		48		46		36		43	
Gross Proceeds ($millions)		$85		N/A		$190		$46		$49
Employee Stock Ownership Plans										
Companies Participating	92		97		95		60		90	
Gross Proceeds ($millions)		$82		N/A		$341		$380		$266
Employee Thrift Plans										
Companies Participating	N/A		N/A		50		15		25	
Gross Proceeds ($millions)		N/A		N/A		$247		N/A		N/A
Employee 401k Plans										
Companies Participating	N/A		N/A		63		27		80	
Gross Proceeds ($millions)		N/A		N/A		$258		N/A		N/A
Combined Gross Proceeds 401k and Employee Thrift Plans		N/A		N/A		$505		$460		$510
Customer Stock Purchase Plans										
Companies Participating	N/A		16		15		10		19	
Gross Proceeds ($millions)		N/A		$72		$60		$50		$66
Individual Retirement Plans										
Companies Participating	N/A		N/A		N/A		3		6	
Gross Proceeds ($millions)		N/A		N/A		N/A		$15		$23
Total Proceeds ($millions):		$3,100		$3,600		$4,476		$3,660		$3,388

NOTE: Data prior to 1985 includes original issue and market purchase information; the 1985 & 1986 survey information contains only original issue data.

N/A—Not Available.
Source: EEI Statistics Department

As in prior years, DRPs accounted for the majority of the funds, with $2.5 billion of gross proceeds invested in 1986. This is a slight decrease from 1985 when proceeds invested totalled $2.7 billion. While supplemental cash contributions have been increasing since 1984, dividend reinvestment into the plan has been declining steadily since 1984. The elimination of tax advantages of the plan at the close of 1985 is primarily responsible for the decreasing interest.

Table 1 highlights the survey results for the seven stock investment plans. The table combines the results of the most recent 101-company survey with the previous three year's surveys.

Due to a change in the survey questionnaire, the amount of proceeds for the 401(k) plan are now combined with Employee Thrift Plans. When the gross proceeds of the two plans are combined, an 11 percent increase from $460 million in 1986 to $510 million in 1987 can be seen. Although exact figures for these two plans are not available, the 401(k) plan is expected to be larger in gross proceeds than the Employee Thrift Plan.

TECHNOLOGY REVIEW

RISE—RAPID INFORMATION SYSTEM EXCHANGE

During a planned maintenance outage, officials at Potomac Electric Power Company (PEPCO) discovered a faulty start-up valve. They contacted the parts vendor, only to hear that it would take 60 days to get a replacement part. This delay could have extended the plant outage and resulted in a considerable cost to the company. Instead, PEPCO engineers turned to a computer and accessed an online electronic information service, the Rapid Information System Exchange (RISE). They posted an Information Request that went out instantly to other engineers at over 50 utilities across the country. Two days later, the needed part arrived.

Introduced in 1987, RISE is a special subscription feature of the Utility News and Industry Communication Service, an industry news and electronic mail service developed by Edison Electric Institute (EEI), the national association of America's investor-owned electric companies. Designed for engineering professionals, and available exclusively to EEI member companies, RISE allows subscribers to exchange information electronically about issues related to the design, operation, and maintenance of fossil-powered electric production facilities.

In particular, RISE is designed as a communication and resource network for time-sensitive problems—urgent issues that need to be resolved or shared immediately. Through RISE's Alert and Information Request features, subscribers have immediate, online access to a national network of power plant engineering professionals. In a forced outage situation, for example, an engineer can access RISE and identify professional contacts at other companies who may have experienced similar problems using the same equipment. It is an invaluable resource for sharing technical information, anticipating potential problems, and keeping plants operating productively and efficiently.

According to Bob Racich, Senior Reliability Engineer at Potomac Electric Power Company, this service saved his company considerable time and expense. "In effect, the service has paid for itself already. The difference between two days and eight weeks to get a spare part adds up to a big difference in dollars for the company." Racich adds that the online electronic capabilities of services like RISE are beginning to change the way utilities think and to reshape the way the industry solves its problems. "There has been a tendency to approach problems parochially—as though each power plant were a world unto itself. The truth is that many companies have the same operating equipment, experience similar problems, and share very similar concerns. With RISE, we are no longer operating in a vacuum. There is a national information network designed to meet our specific needs."

Much of the credit for the development and continuing growth of RISE goes to a task force created by EEI's Prime Movers Committee. This group was instrumental in the planning and implementation of the service, meeting regularly over the past two years to design options that would serve the specific needs of engineering professionals.

RISE can be accessed by any personal computer, word processor, or terminal that can communicate over phone lines. Like the Utility News and Industry Communication Service (UNICOM) itself, RISE is menu-driven. When you log on to the system, the RISE Master Menu appears giving you a "table of contents" of service options and a series of simple prompts that direct you in accessing these options. Currently, there are six options available:

About RISE. A handy, online statement about the contents of the major RISE menu options and the purposes for which they were included. "About RISE" provides a practical introduction for new users and an efficient way for experienced users to introduce the system to other engineering professionals within their companies who may just be getting started.

Plant Equipment and Design Database. This option is based on

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▶ *Locate the latest EEI press releases, position papers, and fact sheets on priority industry issues—as well as files and reference materials provided by allied industry organizations such as EPRI and USCEA, which distributes its highly valued INFOWIRES through the UNICOM News Bureau.*

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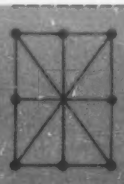

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information from the North American Electric Reliability Council (NERC) Plant Pedigree Database. It lets subscribers identify other companies with operating units similar to their own. It is a keyword-searchable database organized into seven major components: auxiliaries, boilers, condensors, generators, scrubbers, turbines, and plant names database.

All of the component databases have some fields in common (such as Unit ID Number, Company, Size (in MW) and Date), as well as fields or terms unique to specific components and/or subsystems of an operating unit. Searching any of the component databases is simple: a series of prompts directs users through the search process, and special program functions have been designed to maximize the number of plants identified in each search and to minimize search time.

Rise Company Contacts. Once users have identified companies with operating units similar to their own, the RISE Company Contacts Database can be used to find the designated RISE Coordinators at those companies. Participating companies are required to designate a Coordinator for each subscription. This person is responsible for coordinating and disseminating the information exchanged via RISE to all appropriate groups within the company, as well as serving as the point of contact for incoming information requests.

This database can also be searched quickly by keywords: last name, company name, city, state, or subscription identification number. After locating the appropriate company contacts, users can send electronic mail or call these individuals.

Rise Information Requests and Alerts Bulletin Board. The Bulletin Board features allow users to broadcast requests for information on critical issues concerning the design, maintenance, and operation of fossil-fueled plants. The purpose of the RISE Alerts option is to provide information regarding actual emergencies at plants that could have an impact on immediate operations at another facility or on personnel safety. Alert messages are transmitted immediately to all subscribers.

The Information Request option provides timely engineering, operations, and maintenance information during emergencies to those responsible for these functions at member fossil-fired power plants. It is designed to assist companies in reducing downtime and keeping plants operating. Any RISE coordinator may send an urgent (time-critical) information request related to the location of spare or replacement parts, operating or maintenance procedures, vendor programs, etc. The request format allows users to include the level of detail required to ensure a useful response.

The RISE Bulletin Board is electronically "interactive," allowing users to post notices and replies and to search other notices by keyword. There is even a scanning option that allows subscribers to review only those notices or replies posted since they last used the system. All the Bulletin Board functions—reading, posting, replying to, and deleting notices—are easily accomplished through a series of simple, prompted steps. In emergency situations, this electronic network

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6. The lines are thirteen blocks long.
7. My mother won't let me.
8. I didn't sign up.
9. I'm going out of town.
10. Asthma runs in my family.
11. I forgot to eat this morning.
12. I'm allergic to flowering magnolia."

Each one's a doozy, but we're hoping you won't use any of them. Give blood through the American Red Cross. Please, don't chicken out.

EXCUSES DON'T SAVE LIVES. BLOOD DOES.

American Red Cross

can save utilities time and money by accessing the experience and expertise of engineering professionals across the country.

Electronic Mail. RISE subscribers have access to the same electronic mail system that UNICOM subscribers use to communicate with other participating electric utility industry professionals.

Engineering & Operations Publications Database. A major new addition to the RISE menu is direct access to the Engineering and Operating Publications Database (E&O Pubs)—previously a separate service available only through EEI's Utility Information Databases. Now, RISE users who are also E&O Pubs subscribers can go directly from RISE to the database and back again without getting offline or having to redial. This "gateway" is part of EEI's continuing goal of making utility-related research and communication a "one-stop" activity by linking various electronic services.

E&O pubs is an online bibliographic resource comprising more than 10,000 information summaries dating back to 1970. Updated regularly, the database, which includes experience reports, technical papers, and survey information from E&O Division committees, as well as pertinent article summaries from trade journals and other major industry publications, is available to EEI members.

RISE subscribers receive a broad range of support services to help them make the most of this valuable resource, including a user's manual and access to a telephone hotline for immediate answers to questions. Hands-on training is available several times a year through EEI's free seminars at sites around the country. EEI is currently considering an annual meeting where RISE coordinators will compare notes, share experiences, and recommend additional options and enhancements to the service. EP

REGULATORY REVIEW

AIDS: UNRESOLVED LEGAL ISSUES AND EMPLOYERS' LIABILITY

AIDS as a legal issue in the workplace presents many problems to both the employee and the employer because there are so few answers that the legal system can presently provide. The scope of the rights of each party in the employment relationship simply have not been determined; many of the issues raised by AIDS-afflicted employees are without precedent in the American legal system.

The most significant and tangible legal development to date has been the near universal acceptance of AIDS as a handicap or a disability, and the resulting coverage of AIDS-afflicted employees under existing statutory prohibitions against discrimination against the handicapped. The Supreme Court of the United States has virtually defined the risk assessment for AIDS (and other infectious diseases) in its remarkably well-written opinion in *School Board of Nassau County, Florida v. Arline*, 55 U.S.L.W. 4245 (March 3, 1987). Any discussion of AIDS as an employment issue has to start now with the *Arline* opinion. Mrs. Arline, a school teacher afflicted with tuberculosis, sought reinstatement despite her affliction. She utilized the provisions of the Federal Rehabilitation Act, 29 U.S.C. §794, alleging discrimination against her based on her condition as a victim of an infectious disease. The School Board was subject to jurisdiction under the Act as a Federal grant recipient.

The Supreme Court adopted her reasoning that infectious and communicable diseases are in fact handicaps under the Federal statute, a significant holding having im-

Jon Riley / Folio, Inc.

Although the legal precedents regarding AIDS as a workplace issue are few and far between, they do suggest certain guidelines a company should consider to protect the interests of both employer and employee.

plications not only for tuberculosis, but also for AIDS and a host of other conditions. The Court then went on to evaluate the risk assessment procedure to be applied in similar claims of handicapped discrimination. The Court adopted an American Medical Association four-part inquiry that weighs the likelihood of infection and the severity of the risk against the probabilities that any such disease will be transmitted (55 U.S.L.W. 4249). Perhaps of greatest significance is the following line in the Court's opinion: "In making these findings, courts normally should defer to the reasonable medical judgments of public health officials." The message is clear: employers, and judges and lawyers, should leave medical judgments to medical officials.

For all concerned in an AIDS situation, this pronouncement by the Court is a beacon of direction in an otherwise murky situation. It would appear that the Supreme Court has realized that judges, lawyers, and employers are for the most part poorly equipped to make the medical decisions involved in a public health risk assessment. The recognition that public health officials know their jobs better than lawyers know public health is a significant one; the legal system does not often see an abdication of a fact finding to some other kind of professional. Here, the Supreme Court is basically telling judges that the tough questions about AIDs and other diseases can and should be left to public health officials.

The *Arline* case has been in many ways a simplification of the AIDS discrimination issue. Prior to March of 1987, there had been a scattering of state administrative decisions in which AIDS had been recognized as a handicap, but there had been no lawsuits successfully prosecuted to a conclusion on that premise. There remain no fully concluded trials on an AIDS discrimination issue anywhere in the United States. There have been approximately 25 lawsuits filed on behalf of employees seeking reinstatement, back pay, medical and insurance benefits, attorney's fees, and, in some cases, damages for AIDS-related discrimination. There have been a variety of other AIDS-related cases, involving housing discrimination, child custody and visitation issues in domestic cases, slander arising from false accusations regarding AIDS affliction, breach of confidentiality in release of AIDS-related diagnoses, and a variety of other cases covering a range of issues not so easily classified.

Given the absence of legal precedent, employers, and employees for that matter, are left without any clear guidelines as to how to proceed when confronted with the fear or the reality of an employee afflicted with AIDS. However, there are some simple guidelines that companies can follow to help protect the interests of both the employee and the employer:

Confidentiality: This area will certainly be litigated in great detail in the immediate future. Employers face perhaps their greatest exposure in these types of claims.

It appears if an employer transmits information about any employee's health to any other person within the company or outside, the burden of justifying that transmission rests entirely on the employer. Telling even one other person about an AIDS diagnosis creates the risk of problems for the employee and the employer, and simply should be avoided. Safeguards should be installed in all files regarding employee health to avoid even accidental transmission of employee health information.

Those cases that have addressed this issue seem to be strongly in favor of the employee's right to such privacy, although individuals have fared less well against federal government treatment of their records. See, for example, *Hammonds v. Aetna Casualty and Surety Company*, 243 F. Supp. 793 (N.D. Ohio 1965); *Vassilides v. Garfinckel's, Brooks Brothers*, 492 A. 2nd 580 (DC App. 1985); but see *contra Logan v. District of Columbia*, 447 F. Supp. 1328 (D.D.C. 1978); *Hoesl v. United States*, 451 F. Supp. 1170 (N.D. California 1978). See also *Gilman, Prescribing Privacy: The Uncertain Role of the Physician in the Protection of Patient Privacy*, 62 North Carolina Law Rev. 225 (1984); *Head v. Colloton*, 331 N.W. 2d 870 (Iowa 1983).

Discrimination: The *Arline* case makes the emphatic point that AIDS and other infectious diseases will be treated as handicaps under the Federal Rehabilitation act, 29 U.S.C. §794. All employees of Federal contractors and grant recipients are covered by these antidiscrimination provisions, and virtually all local governments, law enforcement agencies, school boards, housing authorities, and similar bodies are subject to them as well.

Similarly, 41 states and the District of Columbia have enacted more or less parallel provisions for the protection of disabled or handicapped employees, although terms of theses state statutes vary widely. Georgia and Kentucky, for example, exclude infectious diseases specifically. Others have administrative procedures as prerequisites to any litigation.

Further complicating the picture is the abundance of local ordinances enacted in municipalities regarding acts of discrimination against persons with AIDS. These ordinances typically provide an administrative investigation upon the filing of a claim, and may also provide litigation remedies as well. These remedies are largely untested but may be most pointed as a deterrent against discrimination against those with AIDS.

Although there has been little interpretation of these statutes to date, it appears certain that AIDS will be deemed to be a covered condition under all but those statutes specifically excluding infectious diseases. It appears equally certain that an AIDS-afflicted employee presents little or no identifiable medical risk to either other employees or customers. Consequently, the fact that customers will not be happy being served by an AIDS-afflicted employee is not a basis for action against the employee. See *Diaz v. Pan American World Airways, Inc.*, 422 F. 2d 385 (5th Cir.), *cert. denied* 404 U.S. 950 (1971).

The Rehabilitation Act and most state and local provisions require that an employer attempt a "reasonable accommodation" for an employee's handicap or disability. As AIDS requires little in the way of accommodation in the same sense as wheelchair ramps, the requirement for "reasonable accommodation" puts direct burden on the employer to act responsibly in assessing actual risks in the workplace. Failure to act responsibly will be a open admission of liability to the employee, at least for back pay, attorney's fees, and reinstatement.

Other Liabilities: Acts against AIDS-afflicted employees may expose an employer to liabilities in perhaps wholly unexpected areas. The health insurance implications of AIDS are a matter of considerable concern to the insurers; to the extent that an employer is self-insured for health insurance, or contributes to the employee's coverage, health insurance becomes an issue for the employer. Any employment action or termination that has implications for an employee's health or life insurance coverage may have significant consequences under COBRA,

SHOULD YOU WORRY ABOUT AIDS AND THE WORK-PLACE?

The American Red Cross addresses the most often asked questions about AIDS and the workplace:

CAN AN EMPLOYEE WITH AIDS INFECT OTHER EMPLOYEES?

The AIDS virus cannot be spread by everyday contact in the workplace. An employee with AIDS can infect another employee only if they have sexual contact or share intravenous drug needles.

CAN THE AIDS VIRUS BE SPREAD BY USING A TELEPHONE OR WATER FOUNTAIN?

No. The AIDS virus is not spread through air, water, or on surfaces, such as telephones, door knobs, or office machines. The virus is spread mainly through an exchange of body fluids during sexual activity, or the exchange of blood as occurs through sharing contaminated IV drug needles.

SHOULD I PROVIDE OR DESIGNATE SEPARATE BATHROOM FACILITIES FOR EMPLOYEES WITH AIDS?

There is no need to. The AIDS virus is not spread through ordinary use of toilets, sinks, or other bathroom facilities.

CAN I TELL IF SOMEONE IS INFECTED WITH THE AIDS VIRUS?

There are many *carriers* of the virus who do not have the symptoms or signs of the disease and may or may not develop the disease. A carrier of the AIDS virus can infect other people but not through ordinary workplace contact.

WHAT IF I TOUCH A COWORKER WITH AIDS WHO HAS A BLEEDING CUT?

There is no reason to believe that AIDS could be spread this way. Whether a person has AIDS or not, all open, bleeding cuts should be taken care of by observing good health and hygiene practices.

HOW SHOULD EMPLOYEES WITH AIDS BE TREATED?

On a day-to-day basis, treat them normally. You and your employees should learn about AIDS, and when dealing with their problem, use compassion and understanding.

Above all, remember...

AIDS IS HARD TO CATCH.

This information is based upon data from the U.S. Public Health Service. For more information, call your local health department, the Public Health Service Hotline (1-800-342-AIDS) or your local Red Cross Chapter.

Or, if you're interested in an educational program about AIDS for your company, call your local health department or your local Red Cross Chapter.

WE WANT YOU TO KNOW AS MUCH ABOUT AIDS AS WE DO.

American Red Cross

Ad Council

which guarantees the employee the right to convert a group health insurance policy to individual coverage upon termination or resignation.

Interference with insurance coverage, particularly under the extreme circumstances of an AIDS affliction, may involve claims of bad faith, a particularly open-ended exposure for an insurer or employer. See, for example, *Klaudt v. Flink*, 658 P. 2d 1065 (Mont. 1983); *Jenkins v. J.C. Penney Casualty Insurance Co.*, 280 S.E. 2d 252 (W.Va. 1981); *Royal Globe Insurance Co. v. Superior Court of Butte County*, 592 P. 2d 329 (Cal. App. 1979), all upholding bad faith denial claims against insurers; *contra*, *A&E Supply Co. v. Nationwide Mutual Fire Insurance Co.*, 798 F. 2d 669 (4th Cir. 1986) (Va. law); *Seeman v. Liberty Mutual Insurance Co.*, 322 N.W. 2d 35 (Iowa 1982); *Cohen v. New York Property Insurance Underwriting Associates;* 65 A.D. 2d 71, 410 N.Y.S. 2d 597 (1978), all denying such an action.

A similarly unsettled picture is presented in the area of damage claims for wrongful termination of employment. Should an employer terminate an employee because of an actual or perceived AIDS affliction, some states provide an action for damages from the wrongful termination. See, for example, *Tameny v. Atlantic Richfield Co.*, 610 P. 2d 1330 (Calif. 1980); *Troy v. Interfinancial, Inc.*, 320 S.E. 2d 872 (Ga. App. 1984); *Sides v. Duke Hospital*, 328 S.E. 2d 818 (N.C. App. 1985); but *contra*, *Ivy v. Army Times*, 428 A. 2d 831 (D.C. App. 1981); *Todd v. South Carolina Farm Bureau Mutual Insurance Co.*, 278 S.E. 2d 607 (S.C. 1981); *Brower v. Holmes Transportation, Inc.*, 435 A. 2d 952 (Vt. 1981), all finding no action for wrongful terminations.

In addition, denial of pension and other benefits to any terminated employee may trigger the extraordinary liabilities imposed upon pension fund managers under ERISA, 29 U.S.C. §1101, a subject fraught with expensive perils for employers. Benefit plan administrators face penalties of up to $100 a day for the denial of employee pension and other benefits. However, a recent Supreme Court case has restricted claims for denial of benefits to those specified in the ERISA statute, rejecting punitive damages, compensatory damages for denied benefits, and bad faith claims. *Pilot Life Insurance Co. v. Dedeaux*, 107 S. Ct. 1549 (4/6/87).

The rapidly increasing number of AIDS cases, and the heightened awareness among employees of their rights, will translate to increased litigation in the myriad of issues surrounding AIDS. An employer's best deterrent to becoming part of this wave of litigation is to take reasonable actions after first discovering the facts of the situation and in light of a rational assessment of the medical risks. EP

Contributed by Kenneth E. Labowitz, an attorney with Fagelson, Schonberger, Payne & Arthur, a Virginia law firm.

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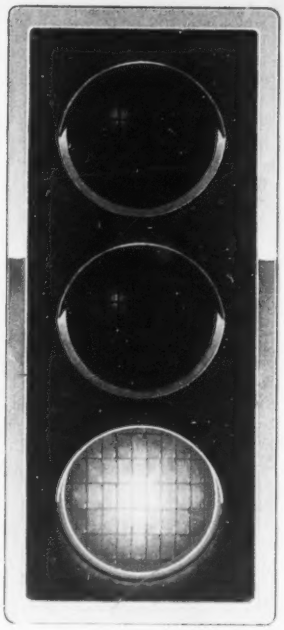

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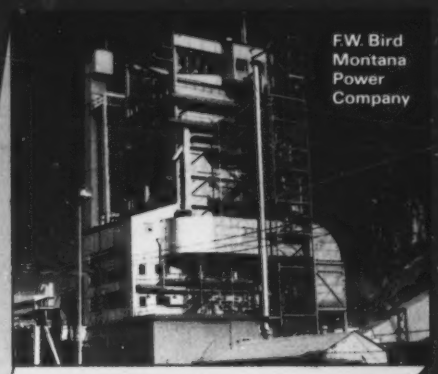

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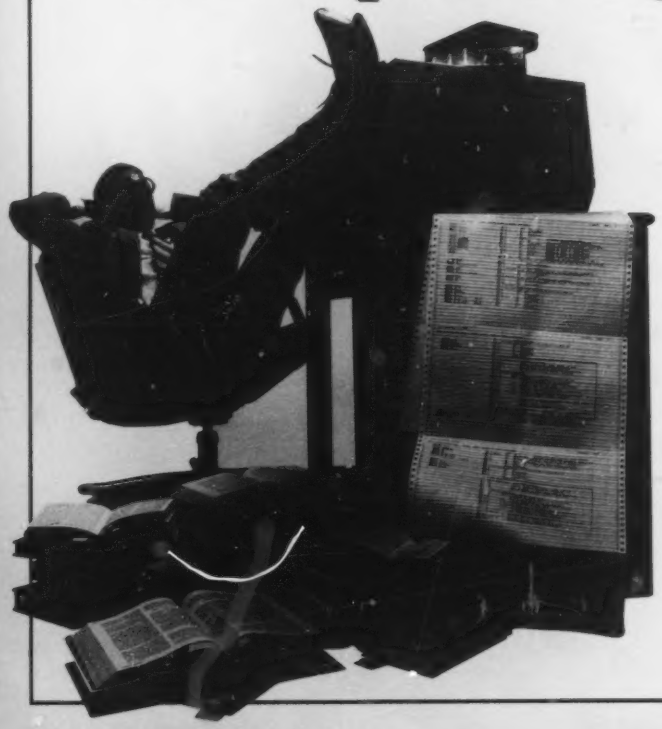

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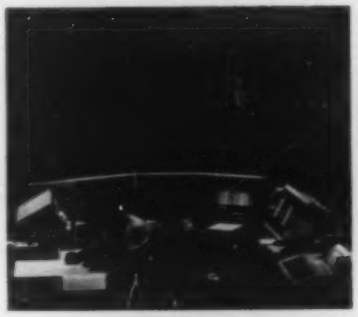

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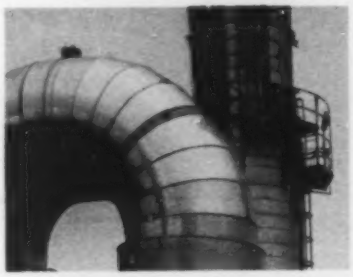

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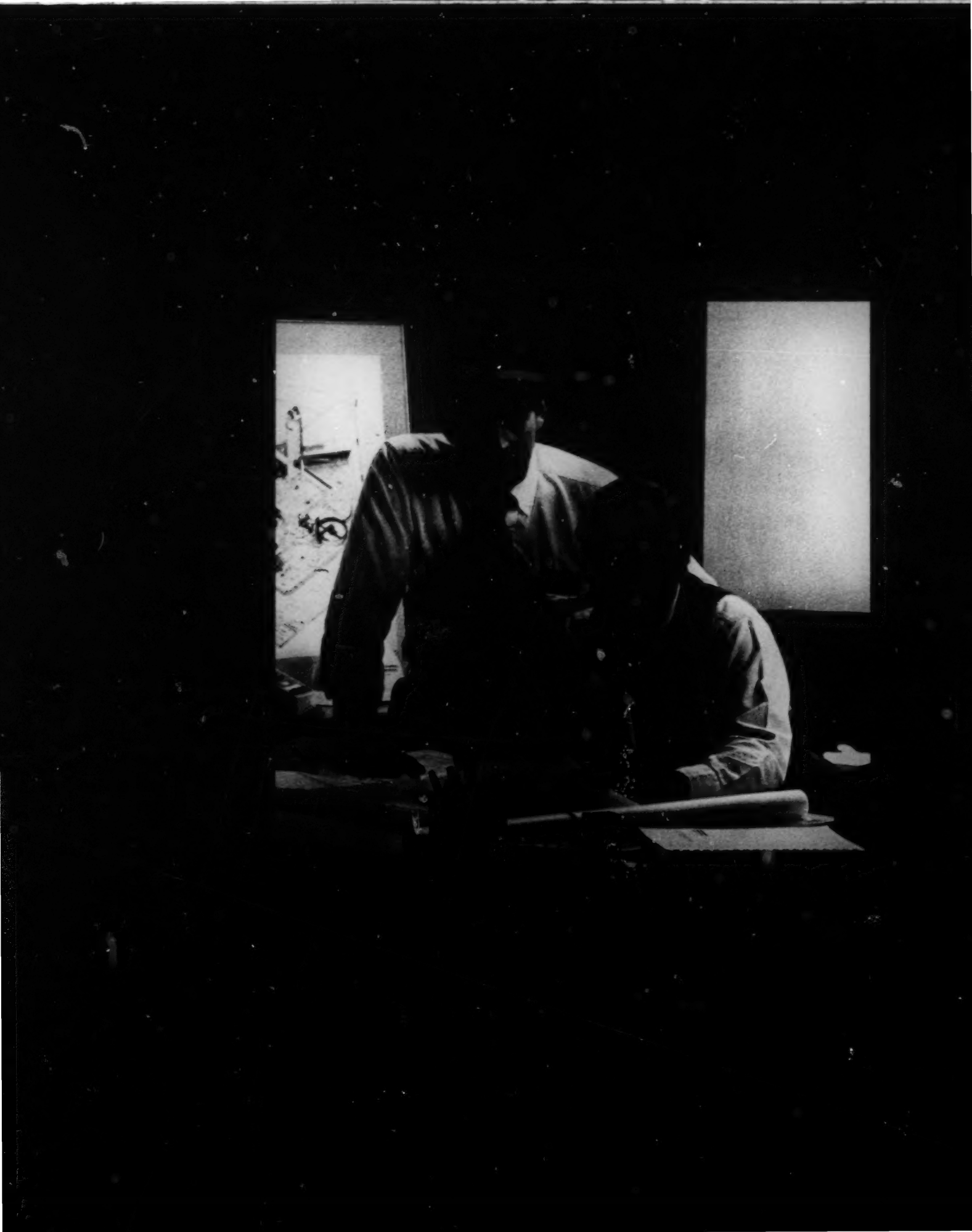

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FERC's Long-Anticipated NOPRs

After a year of discussion and debate, FERC has released three Notices of Proposed Rulemaking that could drastically alter the power supply business in the United States.

The Federal Energy Regulatory Commission (FERC) formally initiated a process that may culminate in an alteration of the U.S. power supply business in ways more far-reaching than any experienced since the passage of the Public Utility Regulatory Policies Act in 1978. By a four-to-one vote, FERC issued on March 16, 1988, three Notices of Proposed Rulemaking designed to respond, in Commission Chairman Martha Hesse's words, "to the fact that generation may no longer be a monopoly in all markets" and to the fact that "in many regards our current system of regulation is outdated." (See Chairman Hesse's article in the Fall 1987 issue of *Electric Perspectives*.)

Needless to say, not everyone with a stake in the power supply business agrees that a radical change in electric utility regulation is necessary or even desirable. Opinions differ not only among the various concerned parties—the electric utility industry, electricity customers, regulators, cogenerators, independent power producers, etc.—but also within each group. In fact, FERC Commissioner Charles Trabandt himself cast a dissenting vote on the proposals, arguing that "we are rushing to judgement . . . without any rational basis."

Clearly, as the saying goes, the issues are ones about which wise men may disagree.

The NOPRs

In a nutshell, the Notices of Proposed Rulemaking, or NOPRs, cover three topics: the pricing of cogenerated power, competitive bidding for new generation, and relaxed regulation for an administratively new class of electric generators called independent power producers, or IPPs.

The March 16 release of the NOPRs culminated a year-long process initiated in the Spring of 1987 when FERC sponsored four regional conferences on the implementation of the Public Utility Regulatory Policies Act of 1978 (PURPA), a cornerstone of the National Energy Act. PURPA was enacted at a time when oil embargoes and long lines at gasoline pumps produced a national awareness of the need for greater energy independence and self reliance. It was designed to encourage conservation and efficient use of resources and facilities, foster equitable rates for electric consumers, promote the development of cogeneration and small power production, and ensure energy independence and diversity. To these ends, PURPA established a market for power produced by cogenerators and small power facilities that, by virtue of meeting certain size, efficiency, ownership, and other standards, obtained the status under the Act of "qualifying facilities" (QFs). The Act requires a utility to purchase QF power at the utility's "incremental cost" and vests in FERC the authority to establish guidelines for determining the purchase price.

In 1980, FERC established that a utility would purchase QF power at a rate equal to the utility's "avoided cost," that is, the cost to the utility of supplying the incremental power itself or purchasing power from some other source. State regulatory commissions may determine avoided cost administratively or by competitive bidding. The four regional conferences sponsored by FERC in 1987 provided a forum for all parties to address their general concerns with the impact of PURPA.

Following the regional conferences on PURPA, FERC Chairman Martha Hesse delivered a speech before the Edison Electric Institute's (EEI) annual convention in Cincinnati, Ohio, in June 1987. In her speech and in several other forums, Hesse responded to the comments made at the conferences on the need for PURPA reform and outlined her proposals on IPPs and bidding. She emphasized that FERC's power supply initiatives are aimed at "guiding the electric industry towards greater efficiency and a more competitive marketplace through competitive bidding of new generating capacity." She also elaborated on her general belief that the electric utility industry had undergone fundamental changes and that regulatory authorities such as FERC needed to reexamine electric utility regulation, focusing on greater competition, increased supply options, and

Eric Ackerman is the Manager of Regulatory Policy and Louis Harris is a Bulk Power Supply Research Analyst at Edison Electric Institute.

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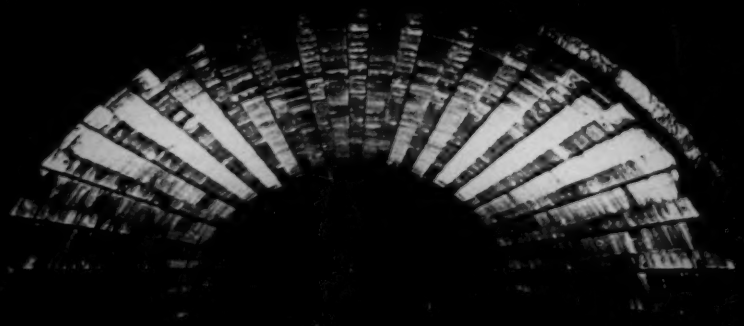


The proposals include many provisions to increase competition among electric power generators.

Les Moore/Unphoto

Enacted when long lines at gasoline pumps were a rather common sight, PURPA was designed to promote national energy efficiency and independence.

more accurate price signals for serving future electricity needs. Hesse suggested that electrical supplies might be better obtained from IPPs via all-source competitive bidding programs. In October, FERC held a technical conference on IPPs where interested parties expressed their views on the new class of suppliers.

Interspersed among these actions were Congressional hearings, various Commission meetings, and a few key FERC decisions—all of which considered and debated the topics addressed by the NOPRs.

The first NOPR, Administrative Determination of Full Avoided Cost, Rates for Sales of Power to Qualifying Facilities, Interconnection Facilities (Docket RM88-6-000), incorporates many reforms advocated by the electric utility industry, various state regulators, and others. It stipulates that utilities should not have to pay for QF capacity that is not needed and that states must consider non-price factors, such as the QF's reliability, financial stability, and the ability to dispatch QF power, when establishing avoided cost. In addition, the NOPR would require states to prepare and make public a determination of how avoided costs were calculated. Further, the proposal states that when a utility's "block" of capacity needs is filled, the states should consider adjusting the avoided capacity costs downward or suspending those costs. Although the Commission declared in an earlier draft of the NOPR (and in a recent decision) that the setting of QF rates above avoided cost was illegal, it did not establish a formal policy in the final NOPR precluding states from setting rates above avoided cost. However, the proposal does clarify rules on the utility's obligation to provide backup service to QFs and proposes that utilities' obligations for backup services be expanded to QF customers. Finally, the NOPR has a provision regarding the facilities necessary to interconnect the QF directly with a utility.

The second NOPR, Regulations Governing Bidding Programs (Docket RM88-5-000), invites states to establish bidding programs voluntarily as a means of determining avoided cost under PURPA and of procuring future power supplies. The NOPR proposes conditions that would be attached to bidding programs, including a provision requiring states to consider all potential sources of supply either directly in a bidding process or via an administratively determined benchmark avoided-cost rate. (It is not entirely clear how utilities would be able to participate in such programs.)

The bidding rulemaking contains two transmission ("wheeling") proposals for comment only. The proposals, first elaborated by Commissioner Charles Stalon, require that utility participation in bidding be subject to its willingness to wheel the power of other bidders. Under the "wheeling-in" scenario, "a utility that wishes to submit a bid to satisfy the capacity needs of some other utility would have to provide firm transmission service to the purchasing utility for successful bidders that are located within the

bidding utility's own service territory or are capable of reaching one of its interconnection points." Under the "wheeling-out" scenario, "a utility's submission of a bid in a bidding program held to satisfy its own capacity needs would be conditioned on the utility's agreement to wheel power to other utilities that border its service area for any bidder that is not successful in the bidding process and that wishes to sell to another wholesale purchaser." Both types of wheeling would be subject to reliability and economic dispatch considerations.

The third NOPR, Independent Power Producers (Docket RM88-4-000), defines an IPP as a "generating entity (other than a QF) that is unaffiliated with the franchise utility in the area in which the IPP is selling power and for other reasons lacks significant market power." It defines "significant market power" for a utility as the possession of transmission facilities that are essential to its customers and concludes that control of 50 percent or more of such transmission facilities conveys such market power. Also, the NOPR discusses the need for IPPs and the Commission's legal basis for relaxing its regulation of them.

Finally, there are several regulatory requirements placed on utilities by the Federal Power Act that this NOPR would relax for IPPs. It proposes to streamline the contents of or requirements for IPP filings regarding the sale of facilities, the transaction of securities, and the issuance of securities. It would remove restrictions on interlocking directorates for IPPs and exempt IPPs from having to follow standard accounting and procurement requirements. Finally, it would relieve IPPs of the requirement to file annual reports and would establish lower FERC filing fees, which will be determined in a later rulemaking, for IPPs.

Taken together, some suggest that the competitive bidding and IPP NOPRs signal a major restructuring of the industry because they fear that independent suppliers would have no utility obligation to serve or stay in business beyond the terms of their contracts.

The Electric Utility Industry's Response

The potential impact of these proposals on a given electric utility company depends, of course, on that particular company's unique situation—how much cogenerated power has it been required to purchase? How much power might IPPs be able to offer? Does it have adequate capacity to meet its current needs? What will those needs be ten years hence? What about its transmission capacity?

In short, even within the investor-owned electric utility industry, individual companies very understandably and justifiably may differ in their analysis of the advantages and disadvantages offered to their customers by certain specifics in these sweeping proposals.

At the same time, however, there are several basic principles with which virtually every company agrees. In fact, at a January 1988 conference attended by utility Chief Executive Officers and sponsored by Edison Electric Institute, the trade association of investor-owned electric utilities, the industry adopted a policy position that articulates a set of principles that must be incorporated in any regulatory changes involving IPPs if the long-term best interests of electric utilities' customers are to be met. (See box on this page.) That policy position, when considered in tandem with an earlier policy position on PURPA, provides a useful yardstick with which to measure the wisdom of the NOPRs and to ensure that competition is fair and workable.

For example, as asserted in the

EEI POLICY POSITION ON INDEPENDENT POWER PRODUCERS
As Approved by the Board of Directors, January 8, 1988

The Edison Electric Institute adopts the following principles concerning independent power producers:

The investor-owned electric utility industry has done an excellent job of serving consumers. For this reason, many in our industry feel there is no need for major FERC proposals; this is not a crisis situation requiring radical changes. But if FERC goes forward:

- Utilities should not be required to buy from IPPs. The decision to buy or not to buy must be truly voluntary, subject to traditional state regulation;
- Utilities must be able to build for themselves under traditional regulation or as an IPP, on the same basis as other IPPs, in or out of their service territories;
- All transmission must be truly voluntary, recognizing that voluntary transmission can be facilitated by more flexible pricing;
- Utilities must retain control over non-price factors; and
- FERC must proceed expeditiously with reforms in PURPA.
- Federal statutes and regulations should be amended to enable implementation of this policy position.

Virtually all utilities agree that even under a competitive bidding system for new generation they must maintain control over non-price factors like dispatchability if they are to meet their traditional obligations to their customers.

principle regarding non-price factors, no utility can in good conscience consider only price when determining the best possible means of meeting its customers' current or future electricity needs. Certainly fuel diversity, supply reliability and dispatchability, and a myriad of other factors specific to local circumstances are important for a utility to meet the obligation to provide all of its customers with a reliable supply of electricity adequate to their needs.

All of the NOPRs contain some discussion of these non-price factors, each acknowledging their importance. For example, the preamble to the proposal on IPPs states that "utilities will have virtually complete freedom to negotiate whatever they wish with potential IPPs to assure system reliability." Clearly, on this point, the electric utility and FERC are in agreement.

Likewise, the industry itself is united on the need for expeditious reforms to PURPA and is pleased that the preamble to the NOPR on PURPA reforms confirms that QFs are entitled to capacity payments only when the utility actually needs capacity.

Any thoughtful analysis of FERC's power supply initiatives and other forces affecting the electric utility industry's future structure and regulations, however, cannot ignore the long-term implications on utilities' continuing ability to meet basic responsibilities in the national interest. Changes which improve economic efficiency and maintain the utility industry's excellent record of supplying adequate and reliable service benefit electric consumers. Proposals for change that would result simply in reallocating costs among groups of customers without improving overall efficiency pose questions of fairness and desirability.

Presently, the backbone of the nation's electricity supply system consists of vertically integrated utilities owning and directly controlling extensive generating resources. The success of the electric power industry in providing high-quality service at reasonable prices has been achieved in large part because of the steady expansion of intersystem coordination for economy and reliability of electric service. This has enabled the industry to take advantage of economies of scale, technological advances, and various forms of cost-reducing power exchanges—all to the benefit of the electric customer. In view of this record, many in the utility industry feel that there is no need for major FERC proposals because there is not a crisis situation requiring major changes.

Still there are some observers who are not confident that the current structure and system of regulation of the electric power industry will bring about low-cost reliable electric service in the future. They point out the myriad of disincen-

John Zoiner/Unphoto

tives for new construction, such as the perils of *ex post* prudence reviews or "Monday morning quarterbacking," and also the open-ended risk of venturing enormous capital to fulfill uncertain obligations and demands. As one electric utility executive put it, the electric utility industry is being judged by standards of prudence "which require foresight to be at least as accurate as hindsight."

For this reason, some industry spokesmen argue that the regulatory compact among utilities, regulators, and electric consumers is irrevocably broken. Others argue that we must work hard to restore the compact so that there is greater certainty, predictability, and flexibility in the regulatory process in the future.

Six Policy Yardsticks

The first principle in the industry's Policy Statement on IPPs—utilities should not be required to buy from IPPs . . .—reflects a concern that utilities need maximum flexibility to negotiate low-cost, reliable power supply agreements, and that they must not be encumbered by any obligation to purchase power from IPPs. Utility experience with mandatory purchase requirements from PURPA shows that when utilities are obligated to buy from non-utility suppliers having no obligation to serve, those suppliers may have no incentive to offer competitive terms. Thus, utility customers end up paying more than they should.

For example, a representative from Houston Lighting & Power Company testified last year during the regional PURPA hearing in New Orleans that over a period of eight years its customers will be overcharged *one half billion dollars* because the company was required to sign fixed-term QF supply contracts. The representative also described abuses in terms of QF buy/sell practices, explaining that:

> On our system, these cogenerators buy power at rates as low as 2¢ per kilowatt-hour and sell power back to us at rates approaching 5¢ per kilowatt-hour. In some instances very little of the power actually flows into HL&P's system. We are simply collecting money from our customers and sending a payment to the cogenerators for self-generating.

Thus, utilities believe that programs to acquire power from IPPs and others should be "voluntary." There is some concern that the NOPR leaves the option to implement bidding with the states, and that utilities in states that elect to implement bidding could be forced to purchase from certain sources, which as the PURPA experience has shown, can ultimately result in higher rates for customers than necessary.

Likewise, there is some ambiquity regarding the ultimate impact of the bidding NOPR's proposal to allow states to "set aside" blocks of capacity for particular technologies or fuels, provided QFs are given the opportunity to satisfy these blocks. While it is possible that state regulatory authorities might reserve some capacity for traditional supply by utilities, it is also possible that there will be increasing pressure from authorities to utilize the set-aside option to promote particular technologies or fuels or fulfill social objectives. If such is the case, utilities would have to pay more for that power than they would for power from other sources, and customers would witness higher rates.

The second principle of EEI's Policy Statement—utilities must be able to build for themselves . . .—reflects a fundamental concern that, whether intended or not, the NOPRs may make it difficult, if not impossible, for utilities—the most experienced and efficient suppliers—to play a role in future electric supply. For example, although the preamble to the bidding NOPR states that preventing utilities from bidding for their own power needs would have the effect of excluding "from participation the very supplier who is often the most experienced and most knowledgeable about the needs of the electric system and its customers," nothing in the proposed rule itself explicitly precludes state regulatory boards from excluding utilities from bidding to meet their own needs.

Similarly, utilities are concerned

that, by relieving IPPs of certain Federal Power Act requirements that utilities would still have to meet, the IPP NOPR may leave utilities with a substantial competitive disadvantage vis-a-vis IPPs. Thus, one possible outcome of the IPP NOPR is the exclusion of utilities from providing power supplies by default despite the language in the bidding NOPR referenced above. For example, relaxation of securities filings and accounting rules would enable independent power producers to use a greater share of debt financing than utilities, who would have to rely more on costly equity financing. And relieving independents from restrictions on interlocking directories and security transactions gives them a greater degree of flexibility than that afforded utilities. Finally, the mere fact that filing requirements, application contents, and fees would be reduced for IPPs gives them a direct cost advantage.

The third principle of EEI's Policy Statement—all transmission must be voluntary . . .—reflects the industry's opposition to mandatory transmission access ("wheeling") and a desire to see transmission pricing reflect the full cost of providing the service. At present utilities voluntarily wheel for others. This arrangement has worked well, as demonstrated by the fact that both the percentage of sales requiring wheeling and the actual amount of power wheeled have dramatically increased over the past twenty years.

Because most utilities' transmission lines are interconnected with

the lines of neighboring systems, whenever one of those utilities sells power on the wholesale market, that power flows over most of the interconnected lines—many of which are owned by utilities not party to the power exchange. Thus, bulk-power transactions need to be highly coordinated to ensure that fragile transmission lines are not overloaded by inadvertent power flows, that stability conditions are maintained, and that safety is preserved. Given the critical role that transmission lines play in providing reliable service, utilities are fearful that mandatory transmission access would jeopardize the reliability utility customers depend upon.

Gregg Mancuso/Unisphoto

Although FERC has indicated that it is preparing a separate NOPR on transmission-related issues, two of the rules just proposed discuss wheeling.

The ideal pricing system for transmission would compensate utilities and their customers for the full opportunity cost of a transaction foregone when the utility agrees to wheel. Electric utilities believe that the establishment of transmission pricing policies that fully reflect these opportunity costs will make it easier for utilities to provide transmission access whenever such access does not jeopardize the owners' own operations.

Although Chairman Hesse has indicated that FERC is preparing another NOPR to handle transmission issues exclusively, two of the current NOPRs deal with transmission access issues, the one on PURPA reforms and the one on bidding programs.

The NOPR on PURPA reform invites comments on whether or not to allow QFs to wheel power for third parties, and if so, how to regulate them. It also suggests that a QF "could provide transmission service to third parties as a 'public utility' and not lose its QF status." This proposal is in marked contrast to the current precedent at FERC established in recent decisions, which allows a QF to own the facilities needed to interconnect with a utility for two reasons solely—to sell the power that it generates to that utility and to buy power from that utility.

Naturally, utilities believe that if QFs are granted the ability to wheel third-party power, those QFs should be regulated in the same way that wheeling utilities are. The utilities' concern here is similar to their concern regarding the preferences, both intentional and unintentional, given to QFs and IPPs in providing capacity under the proposed bidding programs.

As explained earlier, the bidding NOPR includes a discussion of Commissioner Stalon's proposals to condition a utility's participation in bidding on its willingness to wheel. The rule's preamble concludes that "it is unnecessary to provide for increased transmission access under bidding systems in order to satisfy PURPA," but it does state that wheeling conditions "would not be inappropriate under any and all circumstances."

Given the potential impact on their system's reliability, electric utilities are united in their opposition to mandatory wheeling obligations. Conditioning utilities' participation in bidding programs to provide their own generation capacity by requiring them to provide wheeling services for other suppliers is not in electric customers' best interest.

On the all-important question of transmission pricing, the NOPRs are largely silent, perhaps reflecting FERC's intent to address transmission issues in a separate NOPR at a later date. In fact, the preamble of the bidding NOPR confirms that "the Commission recognizes the importance of pricing transmission to convey correct signals about the resource and opportunity costs associated with transmission services. Hence the Commission intends to proceed expeditiously to review its transmissions pricing policies on a generic basis. In the meantime, the Commission welcomes innovative rate proposals." Still, it notes several possible options, including embedded cost, marginal cost, "split-the-benefit," or market-based prices.

McAllister of Denver / Unphoto

To guard against supply shortages and price increases, utilities consider fuel diversity when selecting generation options. A bidding system must likewise recognize factors other than price.

The fourth principle of EEI's Policy Statement—utilities must retain control over non-price factors—reflects the fact that there are many attributes of power other than price that need to be considered in selecting suppliers. For example, to reduce their vulnerability to price increases or supply shortages of a particular fuel, utilities strive to maintain fuel diversity of their generation. Other non-price factors include the bidder's financial stability, the operational and design characteristics of the proposed capacity, the ability to dispatch the power, the interconnection requirements, reliability, degree of firmness, whether the power is needed for continuous use or during periods of peak demands, and other considerations specific to local circumstances. The policy statement reflects the electric utility industry's concern that utilities maintain control over these non-price factors because utilities are in the best position to know what the overall system requirements are.

All of the NOPRs contain some discussion of non-price factors, most of it consistent with the utilities' concerns. For example, the preamble of the NOPR on PURPA reforms stipulates that states must consider factors such as the QF's financial stability, the ability to dispatch QF power to the utility's system, and fuel diversity. The proposed rules themselves, however, do not reflect all of these stipulations.

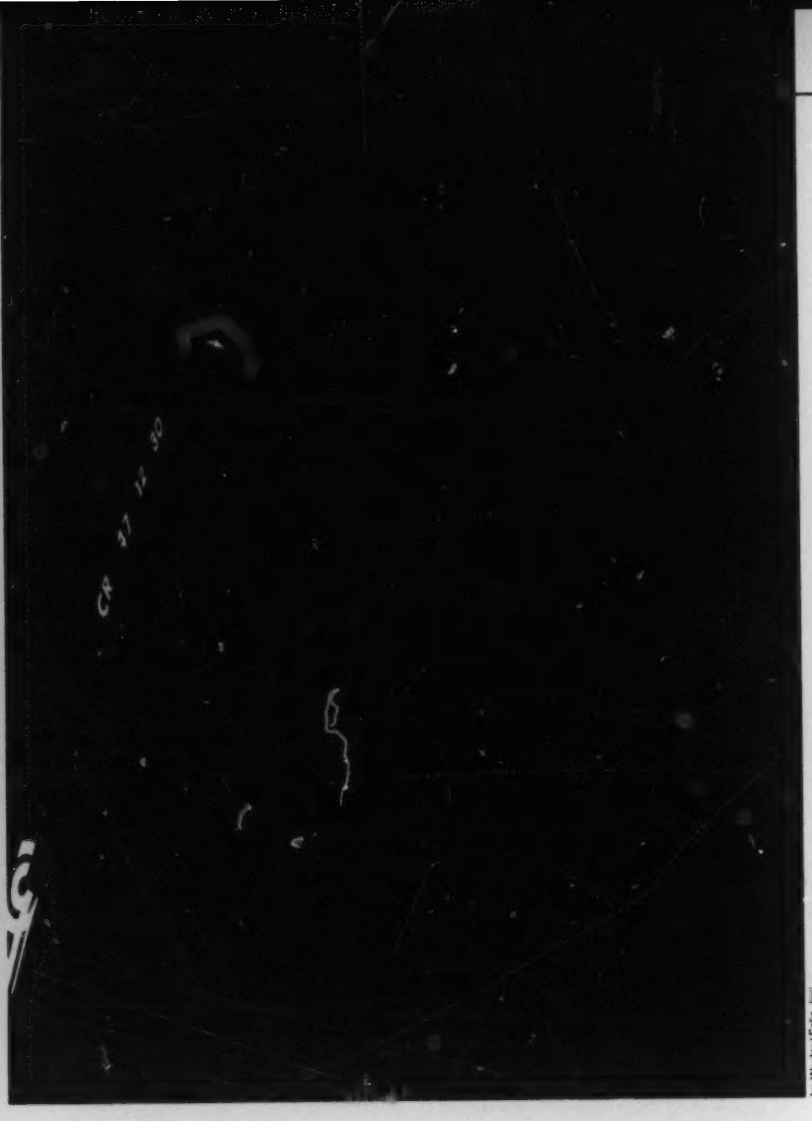
The bidding NOPR contains the following language regarding non-price factors in its preamble:

> . . . a variety of factors which affect the continued security and operational integrity of the purchasing utility's system, including fuel diversity and reliability, must be taken into consideration in selecting purchases. . . . The Commission believes that the means by which attributes other than price will be considered in a bidding system is important in selecting the most effective sources for purchases . . . the Commission will require that the manner in which [such] factors . . . are taken into account be explained in writing in the bid solicitation. . . . This explanation may be developed by the state regulatory authority or the purchasing utility.

The bidding NOPR contains corresponding provisions in the proposed rule, as well, and allows for a post-bid negotiation process to iron-out factors specific to individual winning bidders, a suggestion endorsed by the utility industry.

Finally, the IPP NOPR clearly states that "utilities will have virtually complete freedom to negotiate whatever they wish with potential IPPs to assure system reliability."

Thus, although utilities would prefer to have the final say over



Ira Wexler / Folio, Inc.

non-price factors rather than leaving them to joint utility-state determination, the industry and FERC appear to share a similar position on this topic.

The fifth principle, of EEI's Policy Statement—FERC must proceed expeditiously with reforms in PURPA—reflects utilities' concerns, well documented during FERC's Regional Conferences, that regulations issued pursuant to PURPA have led to outcomes contrary to the statute's intent (i.e., energy conservation, utility resource efficiency, customer equity). While it seems only fair that customers should share in economic benefits that may be realized through cogeneration and small power production—indeed, EEI members explicitly support this proposition—many state policies allow benefits to accrue exclusively to QF owners, or even require a utility's customers to subsidize QF owners.

In particular, investor-owned utilities are concerned that in some states QF purchase rates are set above the utility's avoided cost. Likewise, in some states capacity payments are or have been required even though the purchasing utility does not need the capacity. In both cases, the utility's non-QF customers are, in effect, being forced to subsidize the QF. In addition, to the extent that utilities are required to provide backup, maintenance, or standby power to QFs at rates that do not recover all the costs incurred in providing such service, customers are again subsidizing QFs.

Given these concerns, the NOPR on PURPA reform appears to be a "mixed bag." For example, the preamble explicitly declines to preempt states from setting purchase rates above avoided cost, noting that "nothing in this proposed rule addresses whether states have authority independent of PURPA to set rates for purchases from QFs above the purchasing utility's avoided cost." In fact, the proposed regulatory language explicitly would permit rates above avoided cost when necessary to secure financing for QFs. Thus, the NOPR would permit non-QF electric customers to subsidize QFs.

On the other hand, the preamble does confirm that QFs are entitled to capacity payments only when the utility actually needs capacity, and the proposed rule would require states to base avoided cost determinations on "the amount of capacity or energy needed by the utility and the qualifying facility's ability to meet those needs."

Regarding backup service, the preamble confirms that utilities have an "absolute obligation" to serve QFs. States can waive this obligation, however, if the utility has demonstrated ". . . that provision of these services will impair the utility's ability to render adequate service to its customers or place an undue burden on the electric utility." In addition, there is extensive regulatory language providing guidance on the pricing of backup and maintenance power, the intent of which appears to be to require that backup rates be cost-based to ensure that those costs not be calculated on the basis of worst-case assumptions.

The sixth principle of EEI's policy statement—Federal statutes and regulations should be amended . . . —reflects the concern of electric utilities that federal statutes may

have to be amended to fulfill parts of the overall policy statement.

One such statute is the Public Utility Holding Company Act of 1935. Provisions of the Act would make it impossible for registered holding companies to participate in independent power production outside of their service territories. Moreover, companies that are not holding companies or that are holding companies exempt from the Act might fall under the Act's jurisdiction or lose their exemptions if they invest in IPPs.

All three of the NOPRs are silent with respect to PUHCA, which is not surprising, since changes to PUHCA would require Congressional action.

Future Challenges

Over the years, vertically integrated utilities which characterize the current U.S. system have worked very well for the benefit of electric customers. Whatever flaws may exist in the current system, that system has been able to produce reliable power even in time of severe economic stress. Seen in retrospect, that is a remarkable achievement.

In view of this record, we are not in a crisis situation requiring a major restructuring of our industry. If it is desirable to introduce change in the regulatory system, that change should take place gradually rather than risk disruption to the nation's electric supply system that might result from rapid, untested change.

We have had several months to examine the proposals put forward by FERC. The electric utility industry sees many aspects of these proposals as being very beneficial to electric customers. However, there are also some elements that, resulting in significant changes in the way in which power is generated and procured, would limit the ability of utilities to provide reliable power at the lowest possible cost. We look forward to the challenge of working with FERC to ensure that any final rules maintain the current degree of high-quality service on which our customers depend.

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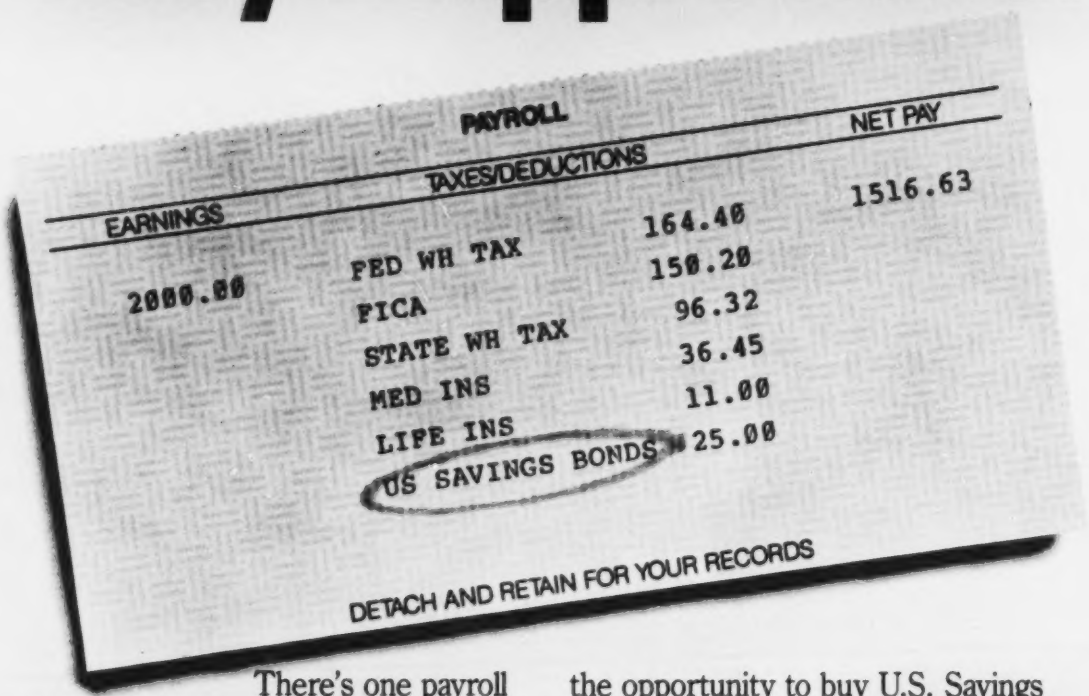

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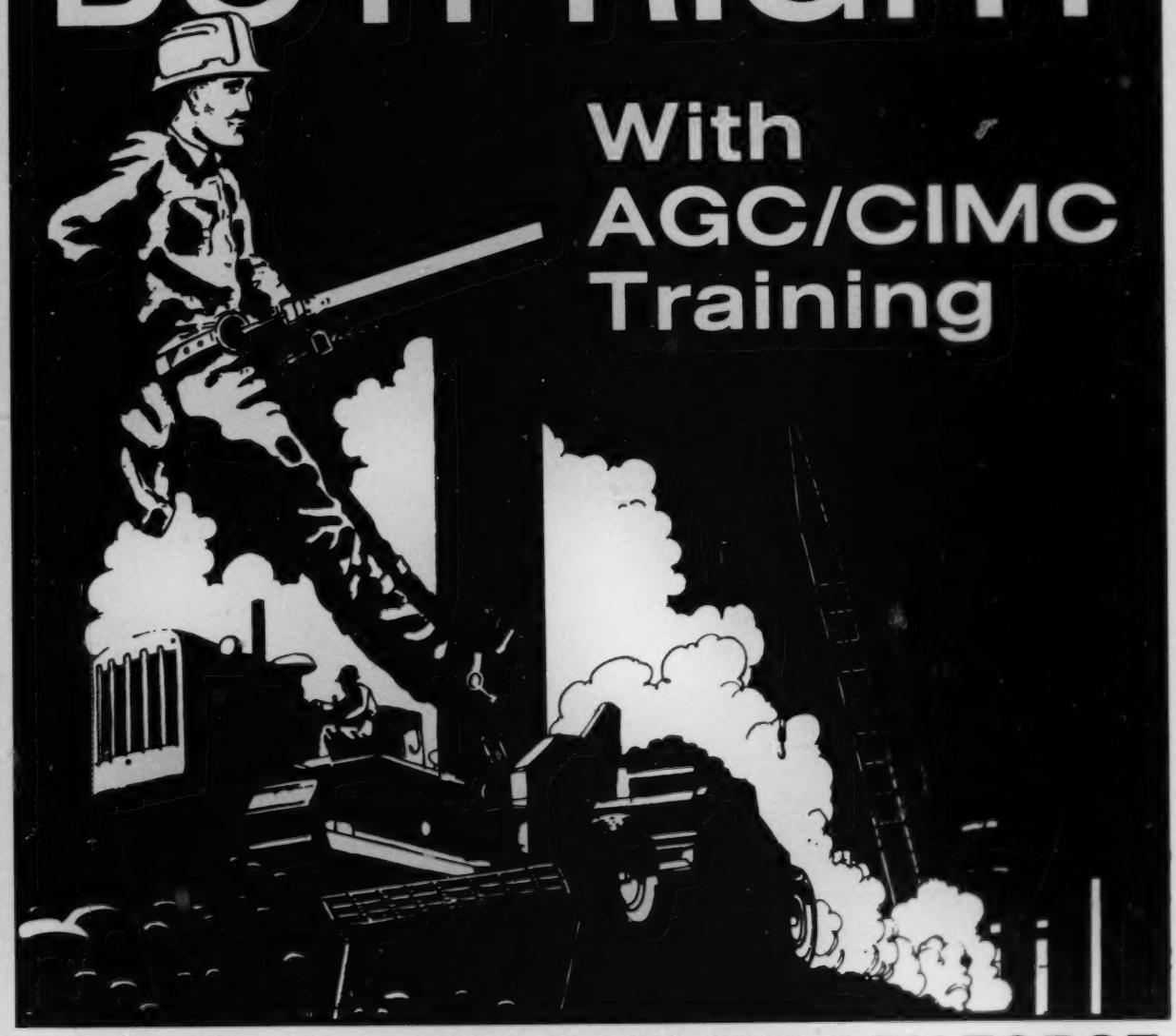

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Non-Utility Power Supply

Edison Electric Institute releases second annual report on non-utility sources of capacity and generation.

As the national debate about the most appropriate public policies for assuring an adequate, reliable, and economical supply of electricity continues to grow, so too does the need for accurate and timely information on the amount, type, and location of non-utility sources of electric power.

In fact, early last year when the Federal Energy Regulatory Commission began soliciting public comments on its rules for implementing the Public Utility Regulatory Policies Act of 1978, no comprehensive statistical portrait of non-utility facilities in the United States existed. Faced with this lack of information, Edison Electric Institute's Statistics Department, under the direction of its Statistical Committee, collected much of this important data and published its findings in an April 1987 report.

Now FERC has issued three new Notices of Proposed Rulemaking, two of which go far beyond PURPA reform. (See "FERC's Long-Anticipated NOPRs" in this issue.) Together they would further increase America's reliance on these non-utility sources of power, making the need for credible information on them even more essential.

EEI's just-published second annual report on the subject, "1986 Capacity and Generation of Non-Utility Sources of Energy," fills that need. It presents statistics for all the non-utility projects in operation in the United States in 1986, revised 1985 statistics based on data collection methods that have been refined and expanded since the first report was published, and a brief analysis of how non-utility capacity and generation have developed since the implementation of PURPA in 1980.

The selected highlights presented here are adapted from tables in the full report. Available from EEI's Order & Billing Department at 1111 19th Street, N.W., Washington, DC 20036, the full report contains data on capacity by year, type of producer and qualifying status; number and size of projects; generation by year, type of producer and qualifying status; electric utility receipts from non-utility producers; type of connection and dispatchability; prime mover; primary energy source; and major industry group. Many of the tables include state and regional breakdowns as well.

For the report, EEI collected data on the 2,449 non-utility facilities in operation at the end of 1986. The data were collected via a questionnaire sent to investor-owned and publicly owned utilities and cooperatives known or believed to have non-utility projects in or adjacent to their service territories. Since all non-utility generators are either located within a surveyed utility's service territory or are known to that utility, and since a large percentage are connected to the host utility for some level of backup service, the electric utility industry is in a unique position to provide information about them.

Betsy DeCampo is Manager of Statistical Information Services and Donna A. Flint and Catherine Norris are Research Analysts, all at Edison Electric Institute.

John Zoiner/Unphoto

Since 1979, non-utility power received by utilities has experienced a sixfold increase, rising from a negligible 0.3 percent of the total electricity available for distribution in the United States to 1.6 percent in 1986.

The rise has been particularly dramatic in recent years; in 1985 and 1986 these receipts grew at annual rates of 46 and 44 percent respectively.

Table 1

Installed Generating Capacity in the United States by Type of Producer (Megawatts)

At December 31st	1986	1985 R	1979
Total Electric Utility Industry[1]			
Investor-Owned Utilities	544,199.1	530,404.9	464,039.6
Government & Cooperatives[2]	163,485.3	158,328.6	134,258.1
Total	707,684.5	688,733.4	598,297.7
Non-Utility Producers			
Cogenerators	18,447.6	17,070.0	10,538.0 E
Small Power Producers	4,953.3	3,839.6	730.0 E
Other Non-Utility Producers	1,919.7	2,010.1	6,610.0 E
Total Non-Utility	25,320.6	22,919.7	17,878.0 E
Grand Total	733,005.0	711,653.2	616,175.7 E

[1]U.S. Department of Energy. Energy Information Administration. *Monthly Power Plant Report* (EIA-759), *Annual Electric Generator Report* (EIA-860), and *Annual Electric Utility Report* (EIA-861).
[2]Government includes federal, state and municipal projects.
E = Estimated.
R = Revised.

Table 2

Electric Generation in the United States by Type of Producer (Megawatthours)

Type of Producer	1986	1985 R	1979
Total Electric Utility Industry[1]			
Investor-Owned Utilities	1,928,199,289	1,918,032,463	1,756,180,000
Government & Cooperatives[2]	559,110,542	551,808,537	491,192,000
Total	2,487,309,832	2,469,841,000	2,247,372,000
Non-Utility Producers			
Cogenerators	88,478,013	78,280,192	N.A.
Small Power Producers	14,528,343	11,457,663	N.A.
Other Non-Utility Producers	9,001,601	8,739,880	N.A.
Total Non-Utility	112,007,957	98,477,735	71,375,000[1]
Grand Total	2,599,317,789	2,568,318,735	2,318,747,000

[1]U.S. Department of Energy. Energy Information Administration. *Monthly Power Plant Report* (EIA-759).
[2]Government includes federal, state and municipal projects.
R = Revised.
N.A. = Not available.

Total non-utility capacity in operation at the end of 1986 represented 3.5 percent of total U.S. capacity, more than a 9 percent increase over 1985's 3.2 percentage share, and more than a 20 percent increase over 1979's 2.9 percentage share. (See Table 1.) Qualifying facilities accounted for almost two-thirds of the non-utility capacity. Three Census Divisions, the West South Central, the Pacific, and the South Atlantic, accounted for 65 percent of the total non-utility capacity.

Total non-utility generation in 1986 represented 4.3 percent of total U.S. generation, a 13 percent increase over 1985's 3.8 percentage share, and a 39 percent increase over 1979's 3.1 percentage share. (See Table 2.) Qualified facilities accounted for more than 60 percent of the non-utility generation. The largest share of the total was generated in the West South Central Census Division.

Conventional steam capacity, representing 52 percent of the total non-utility capacity in place at the end of 1986, accounted for 57 percent of total non-utility generation. (See Table 3.) Twenty-six percent of that conventional steam capacity was located in the South Atlantic Census Division and accounted for 28 percent of the total non-utility conventional steam generation in the United States in 1986.

Table 3

Non-Utility Capacity and Generation by Prime Mover

	Installed Capacity at December 31st (Megawatts)		Generation (Megawatthours)	
Prime Mover	**1986**	**1985 R**	**1986**	**1985 R**
Steam				
Conventional	13,231.8	12,370.6	63,982,286	55,609,360
Fluidized Bed	133.5	3.5	231,802	22,382
Combustion Turbine				
Conventional	5,238.7	4,275.7	21,661,049	21,699,996
Combined Cycle	1,948.0	1,871.9	12,233,852	8,121,986
Internal Combustion	626.4	411.0	1,833,482	1,192,898
Hydroelectric	1,281.5	1,054.8	5,115,620	4,331,856
Wind	1,906.3	1,491.7	1,795,665	1,036,555
Solar	137.7	82.6	79,755	42,693
Geothermal	218.9	218.9	1,675,463	1,061,956
Other[1]	597.8	1,139.0	3,398,984	5,358,054
Total	25,320.6	22,919.7	112,007,957	98,477,735

[1]Includes fuel cell, nuclear and those projects which did not identify prime mover.
R = Revised.

Table 4

Non-Utility Capacity by Dispatchability at December 31, 1986 (Megawatts)

Dispatchability	Total Non-Utility Producers	Cogenerators	Small Power Producers	Other Non-Utility Producers
Full	747.9	383.5	32.1	332.3
Limited	5,748.2	4,011.6	1,444.7	292.0
None	18,824.5	14,052.6	3,476.5	1,295.4
Total	25,320.6	18,447.6	4,953.3	1,919.7

Table 5

Non-Utility Capacity by Type of Connection at December 31, 1986 (Megawatts)

Type of Connection	Total Non-Utility Producers	Cogenerators	Small Power Producers	Other Non-Utility Producers
Interconnected	18,967.7	13,302.1	4,788.8	876.8
Supplementary/Backup Service Only	3,514.2	3,138.6	51.3	324.2
Stand Alone	2,698.4	2,006.7	113.0	578.7
Not Identified by Connection	140.3	0.2	*	140.0
Total	25,320.6	18,447.6	4,953.3	1,919.7

*Fewer than 50 kilowatts.

In 1986 three-quarters of the total non-utility capacity in operation was interconnected with utility grids. (See Table 4.) Fourteen percent received only backup or supplementary service. The remaining 11 percent, mostly cogenerators, represented ''stand-alone'' facilities generating all their own electricity requirements. While only 59 percent of the capacity installed before PURPA was interconnected in 1986, 92 percent of the capacity installed after PURPA was interconnected.

Of the 18,968 megawatts of interconnected capacity, 34 percent was dispatchable. (See Table 5.) However, only 4 percent was fully dispatchable; the remaining 30 percent had limited dispatchability. Virtually all of the post-PURPA capacity had less than full dispatchability.

Table 6

Non-Utility Capacity by Primary Energy Source by Type of Producer at December 31, 1986 and 1985 (Megawatts)

	Total Non-Utility Producers		Cogenerators		Small Power Producers		Other Non-Utility Producers	
Primary Energy Source	1986	1985 R	1986	1985 R	1986	1985 R	1986	1985 R
Coal	4,342.8	4,370.3	3,344.3	3,246.5	0.0	0.0	998.5	1,123.8
Oil	776.0	629.2	692.4	554.7	0.0	0.0	83.6	74.5
Gas	8,432.2	7,258.9	8,253.0	7,079.8	0.0	0.0	179.1	179.1
Biomass	4,788.6	4,134.4	3,447.2	3,227.5	1,341.4	907.0	0.0	0.0
Waste	2,627.8	2,344.4	1,922.6	1,646.7	76.7	74.8	628.5	622.9
Hydro	1,281.5	1,054.8	0.0	0.0	1,260.7	1,054.2	20.8	0.6
Wind	1,906.3	1,491.7	0.0	0.0	1,906.3	1,491.7	0.0	0.0
Solar	137.7	82.6	0.0	0.0	137.7	82.6	0.0	0.0
Geothermal	218.9	218.9	0.0	0.0	218.9	218.9	0.0	0.0
Other[1]	808.9	1,334.6	788.2	1,314.9	11.6	10.5	9.2	9.2
Total	25,320.6	22,919.7	18,447.6	17,070.0	4,953.3	3,839.6	1,919.7	2,010.1

[1]Includes nuclear, fuel cell and projects which did not identify primary energy source.
R = Revised.

As natural gas prices have declined relative to electricity prices, a growing number of gas-fired cogeneration projects have come on line, making gas the dominant fuel in the non-utility market. (See Table 6.) Natural gas capacity grew by 16 percent in 1986 while total non-utility capacity grew by only 10 percent. The Pacific Census Division had the greatest number of non-utility gas facilities at 178, yet their capacity represented only 15 percent of the total U.S. non-utility gas capacity in place at the end of 1986. The West South Central Division, with only 64 such facilities, accounted for 69 percent of the total U.S. non-utility gas capacity.

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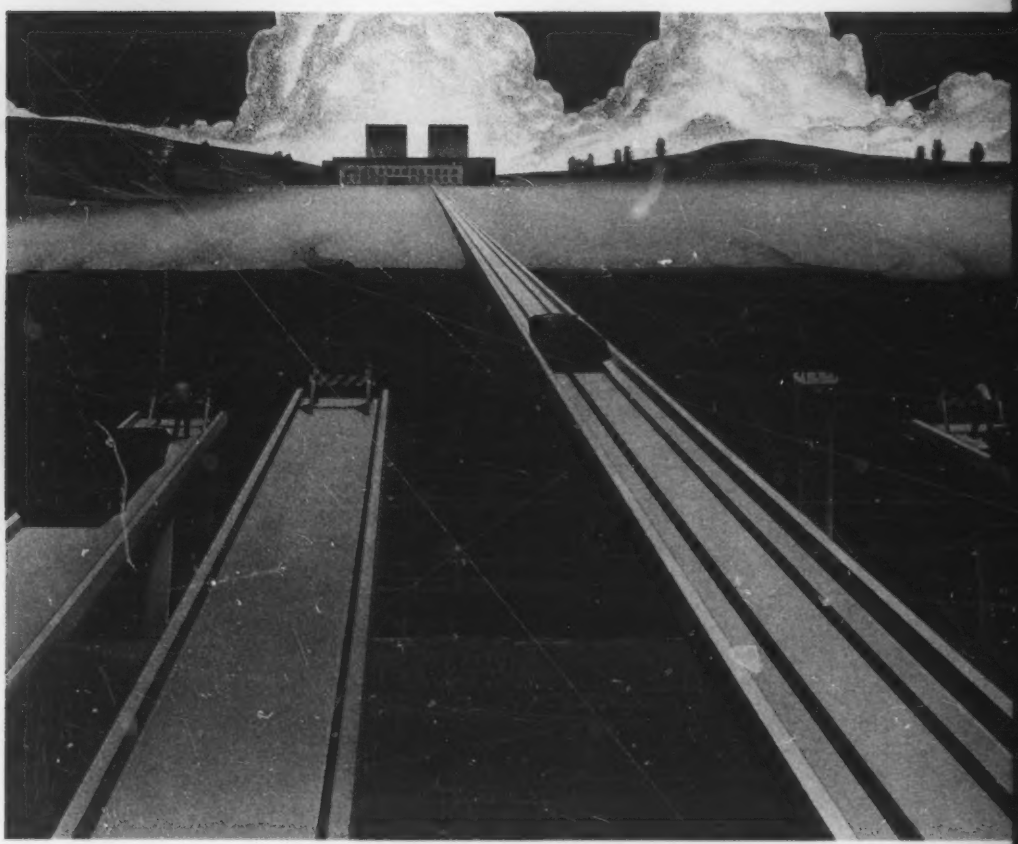

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As the structure of the U.S. economy changes and the workforce ages, the social contract between employees and employers will be rewritten.

The workforce issues that the utility industry and all other U.S. employers will have to face between now and the year 2015 are pervasive and profound. For it is in the workplace that both employees and employers must confront the dramatic shift from an industrial-based economy to a new economic era most commonly referred to as the "information economy."

That there will be a fundamental set of changes in the workforce as a whole can easily be seen from the basic demographic facts that define the American population through the next two decades. As we consider the workforce issues thirty years into the future, it is important to bear in mind that we're dealing with people who are in school, at work, or unemployed today. Most of those who will be working in the year 2015 have already been born and the vast majority are already at work. Those who will be 55 in that year are 28 now and well into the early stages of their careers. Indeed, the issues of the next 20+ years are already with us, and, to the degree that they require action, the time for that is now rather than in the future.

Seven fundamental demographic factors describe the workforce of today and the future:

1. The dramatic decline in the number of entry-level workers (already a drop from 25 million in 1980 to less than 20 million today) will continue.
2. This shrinking pool of workers will increasingly be made up of women and minorities (80 percent by 2000).
3. At the same time, the number of people over 65 is growing and the largest relative growth over the next two decades will occur in the 75+ and 85+ groups.
4. The workforce is now 50 percent women, who, in spite of lower fertility rates, expect both to work and to have children.
5. High school dropout rates in the largest of our cities approach 50 percent among minority youths.
6. The level of preparation for work of many high school graduates is extremely poor.
7. The costs of a college education are escalating to the point that they threaten to reduce even further the pool of college graduates over the next decade.

What this all boils down to is a simple observation that at the same time that we are moving into a period of greatly increasing global competition, the diffusion of sophisticated and costly equipment throughout the workplace, and a new emphasis on the importance of "human resources," serious questions are emerging regarding the numbers and quality of the workers available.

To a certain degree, these facts provide a macro-level perspective on the supply side of the employment equation. What about the demand side? What are the jobs of the future expected to be?

Like the supply side, the demand side of the employment equation is often expressed and discussed based on macro-level forecasts (such as the one presented in Table 1) that attempt to determine the actual numbers of particular occupations/skills that will be needed two decades into the future.

A careful study of these tabular forecasts by an individual employee or an employer would probably yield nothing of real value to either. These tables are rooted in a set of assumptions about the rate of change, organizational design, expansion of knowledge, and the nature of work that may have suited the economy of the 1950s and 60s but have little bearing on the realities of work and employment in the future.

To better understand the demand side of the employment equation, it might be a good idea to get "close to the customer" and try to understand current and projected demands on the qualitative side. (This is the same difference as that between planning for continuous, linear increases in bulk energy de-

Jeffrey J. Hallett is President, TRAC, Inc.

Charles W. Feil / Unophoto

Employees and ***employers alike need*** *to find new ways of* ***working together*** *as the "information economy"* ***evolves.***

mand and planning for energy requirements that are specialized, highly distributed, and dependent on quality, reliability, and flexibility.)

When we look at the workforce challenges to the American economy and to our organizations, we find that they are not issues of numbers and ages and sex and background. They are instead issues of quality, of performance, and of meeting the challenges of an increasingly competitive global economic reality. There are obvious and pressing public policy questions that the expected developments create, but this article will focus on the coming changes in the basic relationships between employers and employees. Given all the broad shifts in the operating environment, industrial and organizational success will be gained only to the degree that we understand and prepare for a new set of conditions and dynamics as they relate to recruitment, careers, training and education, compensation and benefits, employment contracts, employee rights, unions, organization, and retirement.

Table 1

Job Opportunities (U.S. Department of Labor)
(In thousands)

	employment		change 1984–1995	
Occupations with largest job growth	**1984**	**1995**	**no.**	**%**
1. Cashiers	1,902	2,469	566	29.8
2. Registered nurses	1,377	1,829	452	32.8
3. Janitors, cleaners, maids	2,940	3,383	452	15.1
4. Truck Drivers	2,484	2,911	428	17.2
5. Waiters and waitresses	1,625	2,049	424	26.1
6. Wholesale salesworkers	1,248	1,617	369	29.6
7. Medical assistants, nurses	1,204	1,552	348	28.6
8. Retail salesworkers	2,732	3,075	343	12.6
9. Accountants and auditors	882	1,189	307	34.8
10. Teachers, K-6	1,381	1,662	281	20.3
Fastest growing occupations				
1. Paralegal	53	104	51	97.5
2. Computer programmers	341	586	245	71.8
3. Computer analysts	308	520	212	68.7
4. Medical assistants	128	207	79	62.0
5. Data processing equip repair	50	78	28	56.2
6. Elec. Engineers	390	597	206	52.8
7. Elec. technicians	404	607	202	50.7
8. Computer operators	241	353	111	46.1
9. Peripheral EDP operators	70	102	32	45.0
10. Travel Agents	72	103	32	43.9

The Emerging Competitive Environment

Students of American business and management have clearly framed the current and future challenge with calls for increased productivity, for quality and excellence, for a new global awareness, for customer satisfaction, and for innovation. These same goals are stated again and again in articles and speeches from the chief executives in the utility industry and other industries.

Excellence, productivity improvement, innovation, customer satisfaction, and the like are all determined by the skills, competence, and attitudes of the workforce. The great irony of the high-tech, computer-based future is that it makes people MORE important rather than less important. The contemporary assumptions about how people are best organized, managed, and motivated to actually achieve the performance levels required, however, are all based on a model and a basic contract that are out of date.

Our current ideas regarding the rights, responsibilities, and obligations of employers and employees are based on a 200-year history of competing within a domestic, industrial, batch-processing economy. The economic challenge of the past was to meet the demands of a rapidly growing mass-consumption marketplace. We learned how to organize work, people, and materials to produce more, faster, cheaper. We built systems and behaviors in the workplace that were based on a highly educated management class

and a mass of relatively uneducated workers. Our current practices in labor-management relations and the establishment of contractual arrangements between employer and employee were hammered out over the past five decades in the courts and around the bargaining table.

Those two centuries also carved the rest of organizational design and behavior in bedrock. That time was spent learning how to manage and control the organization to meet the demands and expectations of an industrial era. The model or picture that described "how" to organize was precise. It is captured in Figure 1.

This familiar organizational chart reflects the nature of the industrial era and the perceived relationships that existed between employers and employees. Deceptively simple because of its familiarity, it is built on a dying social contract. It defines predictable, long-term career paths; it has clear, linear, tightly drawn relationships indicating higher levels of reward, benefit, and compensation as you move up the chart. It also depicts a clear position for everyone in the organization, enabling the employer to describe in great detail the responsibilities, benefits, and opportunities associated with each and every spot on the chart.

Today, organizational charts no longer have permanent meaning and are being redrawn weekly. Our own boxes are being eliminated, and it is increasingly difficult to know who we really work for. At the core of the basic conceptual framework for managing and organizing the workforce, jobs, and organizations has been the "thirty-year career path." This is no longer a valid concept. No industry, company, division, or job is immune to what will be continuing, rapid, and complex change. Even the utility industry, once perceived to be as slow-moving and stable as any, will continue to experience significant restructuring and change over the next three decades.

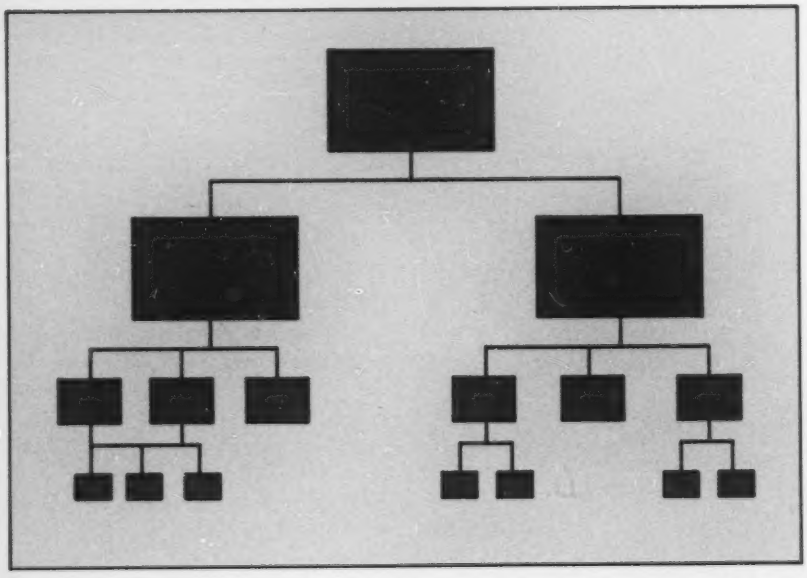
It is here that the vital importance of rethinking basic assumptions about work and employment becomes clear. For example, "entry-level" into an organization or profession has clear meaning in this old model. You start at the bottom and work your way up over a lifelong career. The skills that are needed at this level remain predictable and the numbers of qualified people can be predicted. Their supply and the relative demand for them in the marketplace will determine pay levels. Because these are the jobs and tasks that have been precisely described to require minimum skills and little initiative, the importance of these entry-level people to the overall organization is not very great.

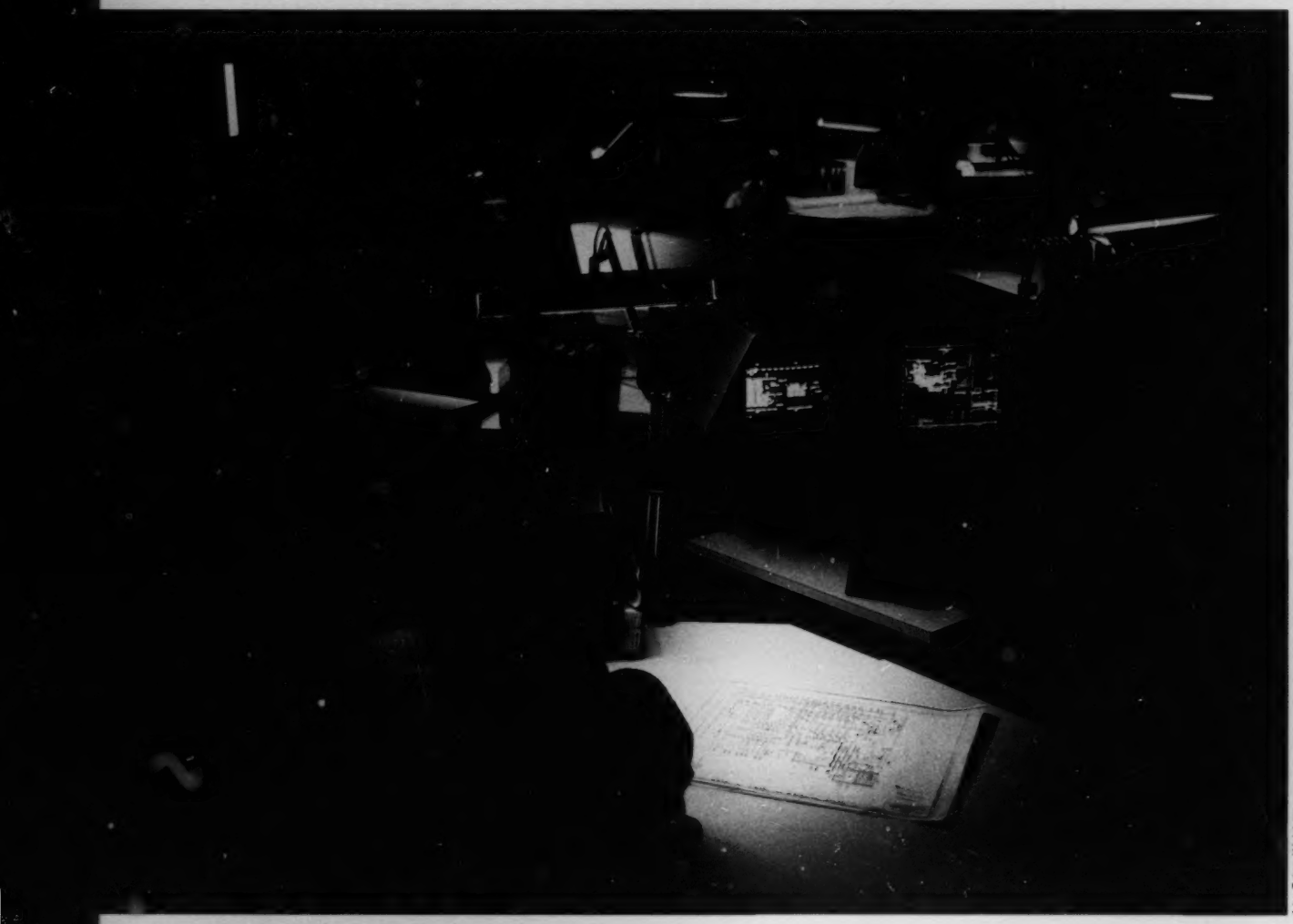
In such a model, established systems of compensation and benefits are driven by complex formulas relating compensation and benefits to a rigorous test of fairness and uniformity (where "fairness" means time spent with the organization, education level, and—sometimes—the results of the firm's performance). The behaviors and the attitudes sought and rewarded were needed by a mass production operation: conformity, reliability, and longevity.

The problem for the future is that these are not the attitudes and behaviors that generate the creativity, flexibility, innovation, and the level of quality we need to compete. Increasingly, we are dependent upon the full contribution of each member of the organization. As we are moving to a workplace situation

Figure 1

The Organizational Chart for an Industrial Era





John Zoiner / Unipholo

Instructional Resource Center / Unipholo

As the nature of our work changes, so must our ideas about workers' rights and responsibilities and how to organize and motivate people most effectively.

where the individual is important, not the job, the entire set of traditional assumptions, policies, and organizational techniques must change to accommodate that circumstance.

The new model of organizational and employee/employer relationships will reflect the changing economy and society. It is non-linear. It is open and it is participatory, as shown in Figure 2.

This chart illustrates the shape of future relationships between employee and employer and is consis-

tent with the new technologies. It is based on continuous flows on information in a non-hierarchical fashion. There is no clear status within any of the individual circles, and a lack of precision in the tasks and responsibilities associated with each. Symbolizing people held together by common purpose and cooperative exchanges, it reflects an organic system able to respond quickly to changes in the external environment.

This is a model that is adapted to the challenges of the current and future business environment. Its purpose is not batch-processing but the delivery of highly responsive customized services in a rapidly changing environment. Its culture is driven by innovation and entrepreneurship rather than by politics and bureaucracy. Individuals and small groups have high degrees of operational autonomy but are bound together by highly interactive information and communication systems.

In this model, the "employees" are just as likely to be temporary as full-time. In this model, the obligations and responsibilities of employer and employee are driven by the value of the expected outcome (performance) rather than by longevity.

Within this emerging environment, all the major aspects of rights and the responsibilities of the employee/employer relationship will be reshaped over the next decade. Nothing will remain unchanged, from the initial hiring process to promotion, career paths, leave policies, benefits, pensions, and retirement. The relationship will change because the basic economic and social conditions that determine the value of the contract are changing.

The contract will change because the information age, without the 30-year career path, will destroy a cornerstone of the old contract. The workplace will be full of turbulence, uncertainty, and disruption. There will be ongoing problems of layoffs, outplacement, and firings as organizations attempt to discover competitive advantage. There will be a flattening of organizations and the end of easily defined "upward career paths" within the organization.

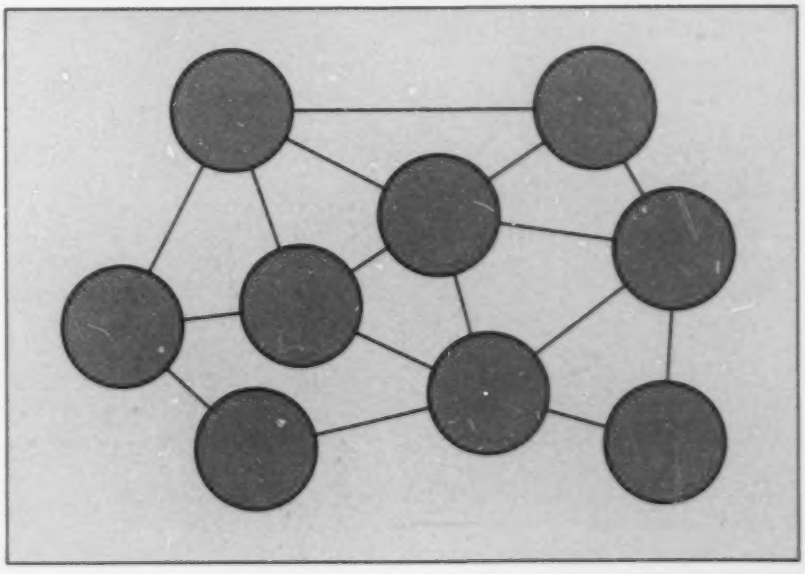
The most basic change we can expect is the end of the driving assumption that work is something we do for someone else. Instead, the new definition of work will be that individuals work for themselves. It is the individual's awareness of change and ability to contribute to the health of the organization—this year—that will define his or her worth. In a sound organization, good communication, cooperative relationships, and expanded training will generate maximum participation by each employee, both in meeting immediate challenges and in preparing for the demands of an unpredictable environment. With this change come shifts in the sense of responsibility for performance and increasing impetus for performance-based pay, for contract work, for temporaries, and for leased employees as integral parts of all organizations.

Compensation and Benefits

How an organization believes it should behave toward its employees is reflected by the contracts it makes with them. There are already a wide variety of contractual agreements that exist between individuals and their employers. Most contemporary arrangements met the needs of an earlier time, but they don't necessarily meet future needs. In fact, nearly all are being reshaped as a new social contract is invented.

Figure 2

The Organizational Chart for the Information Age



Rick Brady/Unphoto

In the future, traditional employment benefits like health insurance will probably be more individualized and flexible, reflecting the differing needs of individual workers.

As with other aspects of work, compensation has been an exchange based on the historic and common model of "a day's pay for a day's work." Most compensation schemes still reflect a period when the time and energy an employee contributed to the organization were all important. Compensation levels remain, in most cases, related to three factors: hours worked, quantity produced, and seniority.

Since compensation is a basic motivating element in all enterprises, organizations will receive the performance and behavior from their employees that the compensation system encourages. If the desired strategic need is consistent, sustained, repeatable actions over specified periods of time where competence comes with experience and seniority, we maintain standard, uniform, and predictable rewards. Where the strategic objective is to produce as many of something as possible, then paying "by the piece" is a useful system.

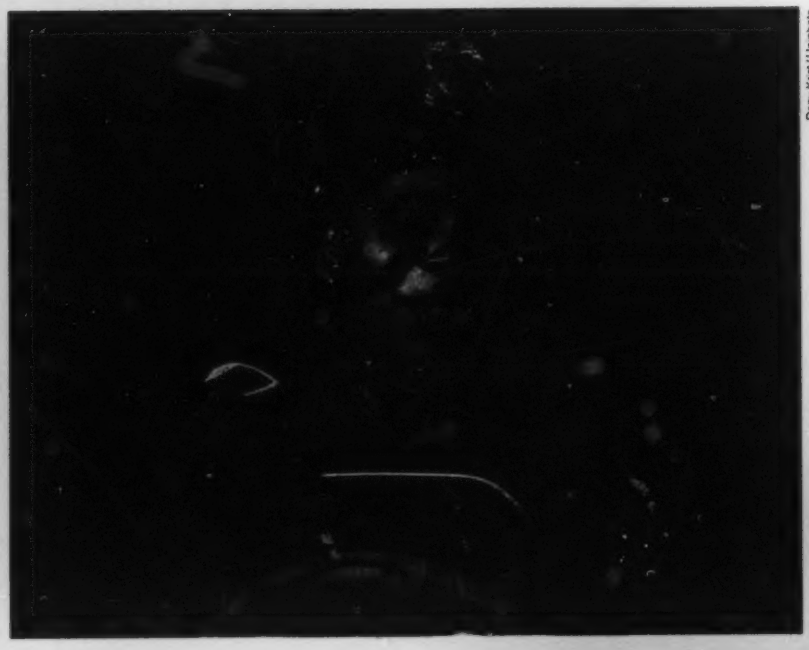
We have developed compensation schemes closely associated with particular jobs or job titles. In the future, as jobs continue to change at a rapid pace or disappear, job-specific compensation schemes are rendered useless.

As the strategic objectives of the organization shift to innovation, competitiveness, and performance, the reward systems must shift to generate the appropriate behavior and skills. What is needed is a workforce capable of obtaining as many skills and as much knowledge as possible to meet emerging performance demands. Consequently, compensation will be more closely tied to skills and knowledge. Here, long-established assumptions regarding age, sex, and credentials disappear as the driving force becomes competence rather than any other characteristic.

Already a growing number of firms are separating the workforce into teams, with compensation tied, in part, to the number and levels of different skills each individual develops. Then, the loss of one individual does not harm the performance of the group. It also creates less anxiety regarding the potential change or elimination of a particular job. There are even movements within local unions to eliminate the seniority provisions of contracts.

Flexible Everything

In the emerging workplace, individuals (like customers and organizations) will reflect a wide range of differing needs. No longer a uniform group, employees will expect



Dany Krief / Unphoto

Minorities, women, and the elderly will make up a growing portion of the workforce as the next century approaches.

options in the types and amount of benefits offered.

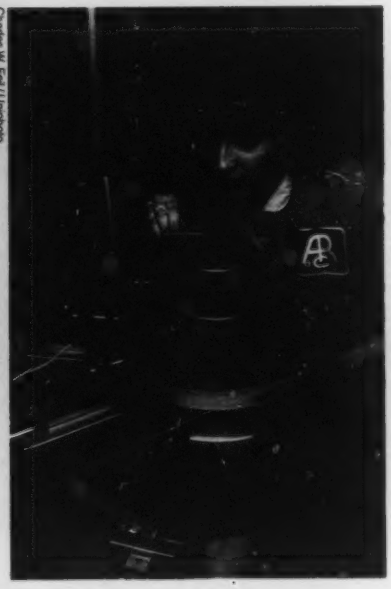
Behind the emerging popularity of a "cafeteria" of benefits is another critical change shaping work in the future. The premise of options and flexibility will continue to expand into the areas of time, location, and other aspects of work. Flextime and telecommuting are growing slowly, but the reasons for their existence are getting stronger and the pace of their adoption will continue to increase. To remain productive in an ever-changing environment, "flexpertise" must be encouraged through expanded education and training programs.

This will add momentum toward the time when our worklives are defined by individual or team contracts with one or more employers. They will be of specific duration, for specific terms, and will be completely open. The expectations will be spelled out and the trade-offs made between certainty and potential returns from high performance. Insurance, health, retirement, and other benefits will be held directly by individuals rather than the employer and will be fully portable. Each employment contract will include negotiations that define how much of the employee's benefit contract the employer will agree to pay as part of the overall compensation package.

Jonathan Taylor Photography / Unphoto

Equity or Comparable Worth?

The compensation issue will really come home to roost with some variation on the "comparable worth" theme. As the workforce is increasing characterized by growing numbers of women and minorities, this issue will be resolved as reality rises from beneath the current intellectual obfuscation based on statistics and mathematical models designed to affix values of jobs that fit the old linear model of organization and management. Comparable worth suggested that everyone engaged in each job should be compensated in a manner that's equal to what others with a comparable mix of experience, education, attributes, and performance results are receiving. If that sounds ob-



Charles W. Feil / Unphoto

tuse, it's simply because the concept of "comparable worth" as it's now being debated is equally obtuse.

What's not obtuse, however, is pay equity for everyone engaged in the same set of tasks or shouldering the same responsibilities. There remain many circumstances where women and minorities are performing precisely the same tasks as white males, yet are receiving far less compensation. This is particularly true when you look beyond direct pay to promotion and advancement opportunities, training, and other less obvious, but crucial, forms of compensation. How the situation developed is really of no concern. It exists today as it has for years, only the inequity is increasingly visible, and, as the composition of the workforce shifts to higher percentages of women and minorities, it will end.

Like other issues of fairness and justice, the mechanism for establishing equity will be established either voluntarily or politically. If employees and employers can't work it out themselves, the mechanisms of government will be brought in to help. The Equal Employment Opportunity Commission (EEOC) can be strengthened, and there can be more quota and inspection systems. What is more likely, however, is a rash of laws and regulations at the state level as different parts of the country respond to the political pressures of their own constituent mix. This alternative may create statistical, emotional, and legal nightmares, but it will get everyone's attention. And if we think that this solution is artificial, we should remember that it is no more artificial than a world where one is placed in higher status and paid more because he happens to be a white male.

Stress, Worker Safety, and Workman's Compensation

The nation has always believed that people who are injured on the job and, therefore, prevented from continuing to work should be compensated for that work-related injury. States have large workers' compensation funds, and there have been historic settlements regarding large-scale exposure to toxic substances, to asbestos, to coal dust. The literature is filled with tragic stories of those who have literally worked themselves to death.

Our laws and our systems of workers' compensation, which have been around since the 1900s, are all derived from the type of injury that occurs when our work is physical. This area too is changing and causing confusion, debate, and another new set of definitions regarding workers' compensation, disability, and disease. Employees now contribute mental and emotional effort on behalf of their employers. The conditions of work that affect our performance are those that relate to our mental and emotional health more than to our physical health.

Stress, burnout, anxiety, depression, and other types of mental injury are already emerging and reflect the new realities and conditions of work. The National Institute for Occupational Safety & Health recently put psychological disorders on its list of leading work-related illnesses and has adopted an objective of reducing stress in high-tech offices (techno-stress).

In 1985, 15 percent of the 100,000 occupational-disease claims filed were of this type and they are growing at a rate of 30 percent a year. The dramatic rise in the number of cases that have been filed and won should give employers cause for worry. In California there were 1,282 mental-stress injuries reported to the workers' compensation board in 1980; by 1984, the number had risen to 4,236.

The potential nuisance and costs associated with a resolution of stress problems in the courts is very high. Some of the recent filings should make this clear:

- An advertising manager claimed anxiety and depression from being overworked.
- A custodian claimed a nervous condition caused by claustrophobia when cleaning a boiler.
- A guidance counselor claimed severe depression from job pressures and students' criticism of his work.
- A policeman claimed anxiety and depression because he viewed his job as demeaning.
- An insurance underwriter claimed a mental breakdown because of an increase in job duties.

Job-related stress will remain high for the foreseeable future as work and the workplace continue to change. What is owed to whom by what part of society will have to be redefined, and that will be a painful process. Emotions will be strained on all sides and injury will be claimed in the courts. Unfortunately, the law in this case is not a solution. New forms of cooperation, communication, and understanding are the solutions. As is true in the other critical factors affecting our worklives, the issue is one of intention and choice. Either we will choose to meet the challenges of change with understanding and with a commitment to move beyond current difficulties, or we will choose to go to court. Some firms have begun to establish counseling services aimed at helping employees cope with stress. At the same time, however, pressures to

Hanley & Savage / Unphoto

"Techno-stress" may become the occupational hazard of the 1990s.

reduce overall costs have led other companies to reduce these services and eliminate insurance benefits for psychological and psychiatric care. It will soon become clear that mentally "healthy" employees are crucial to the competitive capability of an organization and worth the investment.

Employment at Will

One of the clearest examples of the growing struggle to redefine the employee/employer relationship, and a major cause of litigation and stress, is the concept of "employment-at-will." Employment-at-will is the concept that employers have the right to hire and fire at their discretion, with the exception of discriminatory actions or policies. The employment "contract" historically gave the employer the right to hire and fire as an integral part of managing an organization. As society has changed and more power has been given to individuals, this concept has been challenged.

That challenge is simply that management cannot fire on their discretion alone, but that there must be "just cause" for the firing. The argument is that once you are hired, a contract has been made. Therefore, if the organization ever made any statement that the employment was "permanent," then it is legally bound to keep the employee unless he or she is a criminal or negligent.

In 1980 a new legal interpretation essentially declared that statements in an employee handbook or verbal statements by corporate officers constitute a contract. This means that any statement which declares a corporate commitment to retaining employees in difficult times must be maintained, regardless of what transpires. When it does not, an increasing number of fired or laid-off employees are going to court, and the evidence suggests major changes in the basic employer/employee contract will occur.

There are estimates that between 5,000 and 10,000 wrongful discharge suits are initiated each year, and the number is growing. Many of these suits are coming from those over 40 who have 10 or more years with the company. And there are lots of these—30,000 middle manager and 500,000 white-collar workers were dismissed in 1987 alone.

The prospect of litigation and expensive settlements are creating an environment in which there is great reluctance for an employee and employer to make any kind of commitment to each other. In fact, there are cautions in the literature that say "Never, never say to an employee that the job is steady, guaranteed, long-term, permanent, or safe."

Headfastening

Another of the more interesting developments, and terms, regarding the nature of employer/employee relationships is "headfastening." The flip side of wrongful discharge litigation, it is a company's legal attempt to force employees to stay or, if they leave, to restrict their activities.

This development reflects the new recognition that the information, knowledge, and ideas of each individual are of increasing importance to the organization. Losing an employee no longer means losing a body, but losing his or her mind as well. The key knowledge gained from working for a particular employer remains with the individuals doing the work, the thinking, and the creating. If somehow they do not find the personal expression and reward they expect from their abilities and knowledge, they can walk across the street, taking the information and knowledge with them.

This reality has generated noncompete agreements between employers and their employees. Headfastening consists of a variety of employment contracts with restrictive covenants that are directed at preventing individuals from joining a competitor, setting up a competitive operation, using confidential information, or leaving and then recruiting the current employer's employees.

These developments demonstrate how simple the old employment contract was. Workers were hired to perform the same set of very specific functions that hundreds of others had been hired and would be hired to do. Our workplace procedures, expectations, and contractual agreements were generated by this process. As we increasingly employ people for their mental, creative, and personality characteristics, however, the situation changes dramatically.

Jon Feingersh / Unichoto

Families

Another major change occurring in the employer/employee relationship is the new acceptance of the employee as a whole person. Reflected in the growth of parental leave, day care, eldercare, education, spouse counseling, and other programs, the shift recognizes that people have deep personal ties outside of the workplace and the well-being of their families is a vital aspect of their lives.

This new relationship is a natural outgrowth of an environment where the creative, emotional, and personal contributions of employees are important to the organization. Working at a station on an assembly line required only the physical presence of the individual and minimal personal involvement. When employees become the competitive difference between one organization and the next—and they have—then their total attention, enthusiasm, and concern needs to be considered.

A large part of the change is clearly caused by the tremendous increase of women in the workforce. Half of the workforce is female, and it is projected that close to 90 percent of them will have a child while employed. Because it is expensive for an organization to replace someone on a part-time basis, there has been resistance to maternity and parental leave. Only one of three women is covered by any pregnancy-leave policy. Among the largest companies, only 38 percent will guarantee a woman the same job after a leave for child-birth and only 40 percent continue full pay.

Charles Gupton / Unigholo

The dramatic increase in the number of working women is compelling employers to reconsider their policies about family-related issues like child care and maternity leave.

The U.S. Chamber of Commerce estimates that the cost to replace a permanent worker is about $250 a week or $4,000 for a 16-week child-birth leave. This is not the full story, however. Studies of human resource policies that allow pregnancy leave, provide for child care, and generally assist employees in meeting their normal family needs suggest the payback is very high. Absenteeism is reduced, turnover is lower, and morale is higher. Given the growing shortage of workers and the ability to perform work at home, the flexibility associated with allowing a woman time off for child care or a father time off to be with a new-born child is less of a "disruption" to the organization than it once was.

Lifelong Learning and Retirement

The best contemporary observers of work and the changes now underway suggest that to remain productive, we must be a state of continuous learning, effectively retraining ourselves completely every 7 to 10 years. There is no way any of us will be doing what we are doing today in 10 years—to say nothing of 27 years hence—even if we're still employed by the same company. Computers, robotics, telecommunications, bio-engineering, lasers, global economic interdependencies, and shifting patterns of consumption and distribution have only begun to make the impact on our lives that they will have in the next several years.

Increasingly people will retire from their "job" three or four or five times, learning and applying new skills to meet new needs. As this trend continues, both age and educational credentials as surrogates for competence disappear—at both ends of the scale. When our learning curves are only 7 to 10 years long, anyone who has just passed through the most recent learning cycle will be equally productive—whether age 22, 32, 62, or 82. This continuous training process, together with the fact that there simply are not going to be enough young people to fill the needs in the workplace, will work to end the extraordinary age bias we have in our country. Forced to hire "elderly" people, we will discover that their minds, experience, commitment, etc. are indeed valuable assets. They will continue to make productive contributions to society and be compensated for them.

"Retirement" will no longer define the end of the line but will include those periods during which we will study new things, reflect, rest, or raise children. New financing mechanisms will evolve to cover these periods. Retirement funds will probably evolve into fully portable, self-managed pensions that vest after 6 months, supplemented by some form of "educational credit" through the government. Since all signs point to extended years of productive employment, the Social Security problem will, in part, be relieved by income earned during the later years of life.

Ethics, Employee Rights, and Unions

As more and more individuals find themselves suddenly displaced and reports of corruption, inattention, and "bad management" fill the press, there are signs of new strength behind an embryonic employee-rights movement. Dissatisfaction and distrust of management is showing up in polls, surveys, and a growing volume of court suits.

The states are getting more involved with every aspect of the employee/employer relationship, and Congress is also headed in that direction. Corporate officers everywhere are expressing concern about mandated benefits. Table 2 presents a brief list of the areas where there are laws under consideration or already on the books.

Traditionally, the most important force behind the protection of employee rights in America has been labor unions. Once a dominant force in industry, the economy, and politics, there has been a dramatic decline in the role of organized labor. But it would be a mistake to blindly assume there is no role for unions in the future. Unions flourished because of a need for them and there are still 17 million union members.

The historic management/labor perspective that defined the workplace as a battlefield is deeply entrenched. No matter what your background and working experience, there are powerful stereotypes that describe the other side. To many in management, the unions are corrupt, inflexible, over paid, and lazy. To many union members, management is greedy, inflexible, over paid, and lazy.

Nonetheless, labor unions have been vital participants and contributors to the American economy. They grew and prospered for essentially the same reasons as General Motors, General Electric, Bank of America, the American Medical Association, Harvard Business School, and the Democratic Party. To survive into the next century, they all must adapt to a radically different economy or they will disappear. If they do adapt and provide needed services, they can also prosper.

Unions prospered in the past because individual workers needed a way of pursuing their needs and rights within the total work environment. Since there were thousands of individuals working under essentially the same conditions for the same pay, their needs were the same. Collective bargaining evolved to ensure the labor force received its legitimate share.

Over the last 20 years, however, the economic characteristics that favored labor unions have been changing. Consequently, labor unions no longer represent the majority of American workers. From a high of nearly 55 percent in the 1950s, fewer than 19 percent of today's workers belong to a union. The United Autoworkers and the Steelworkers once represented close to 700,000 workers each. By 1990, if current trends continue, they will represent fewer than 200,000 each. The reasons for this trend are intimately tied to the fate of the industries and firms that prospered during that earlier period. Organizations and institutions built to serve the realities of long-term,

Table 2

Employee Rights Laws

Employee Rights	Right to Know Laws—substances in the workplace Protection of Whistleblowers Restrictions on employment at will Prohibition of mandatory retirement ages Plant shutdown notices and severance pay
Employee Privacy	Privacy Acts Limitations on Use of Polygraphs Access to Own Personnel Files Restrictions on Employer Access to Arrest Records
Safety and Health	OSHA Federal Mine Safety Act
Discrimination	Civil Rights Act Age Discrimination in Employment Act Protection—marital status and sexual orientation
Sex Discrimination	Equal Pay Act of 1983 Comparable Worth Statutes
Pensions	ERISA COBRA
Work Conditions	Fair Labor Standards Act No Smoking Laws
Unionization	NLRA Railway Labor Act

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While unions thrived within a batch-processing industrial economy, they too must adjust to the new needs of the workplace if they are to prosper in the "information age."

mass production, batch-processing economies no longer fit.

It appears that the remnants of our industrial unions have begun to pursue a new means of employee representation and assistance. By becoming the single best source of information, training, and standards, unions have potential value for employees and employers alike. We will all need reliable sources of information about developments in our fields. New materials, new skills, new equipment and procedures all must be carefully followed. The places and conditions of employment need to be tracked and evaluated for opportunities. Like the old union hall, computer-based networks representing specific skills and professions may dominate the on-going transaction between employers and employees, but there remains a role in this for unions. A reconstituted set of guilds is imaginable, representing their members, not with specific managements, but within the economic and social system itself.

In this new mode, the unions can make the constructive move toward those activities and programs that ensure employment security for their members. Specific jobs will continue to emerge and disappear at increasing speed. The social and economic need for individuals with the skills and knowledge needed to accomplish new and emerging tasks, however, will always be high. Developing the programs and policies that lead toward higher probabilities of employment security will concern employers, governments, and individuals as well.

The changes underway and the opportunities for the unions are not lost on their leaders. Glenn Watts, President of the Communications Workers of America, has spearheaded the beginnings of a hard self-examination by organized labor. The Communications Workers launched the first major look at the impact of the changes on the union movement in 1981, concluding in a 1983 publication that "the still-evolving Information Age holds both promise and peril for American workers." Later that year Watts wrote: "In the 21st century, a growth-oriented union will probably have some sort of nationwide network of service centers that offer legal, clinical and counseling services for its members, as well as day care assistance and other community services."

As employers and employees struggle to redefine the social contract and as the costs of litigation grow, we could easily create a situation in which it becomes much more effective to again negotiate these matters with a union than to litigate them in the courts.

If the pragmatic demands of re-

kindling a vibrant economy through the cooperation of all involved does not bring about new labor/management relations, perhaps the significant financial power of the unions will. The labor union pension funds in the United States represent a lot of money, and unions are beginning to move toward more activist positions in their investment policies.

For example, unions are beginning to use their human, financial, and legal resources to alter the balance in takeover battles. They may even end up moving toward large-scale employee-ownership through outright acquisition of their firms. In 1986, four Eastern Airline unions joined in a bid for the airline when it was under pressure from an outside raider. The Steelworkers have pursued employee buyouts and retained Lazard Freres, the investment bankers, to help evaluate buyout opportunities. The United Autoworkers and the Steelworkers made a nearly $500 million bid for Robertshaw Controls, a company in which both unions had members, but lost to a British company. There are moves on Wall Street to establish a special union-financed fund designed to look for and support employee buyouts.

Conclusion

These represent but a small portion of the issues and developments that will reshape Americans' daily work, careers, and the organizations that employ them between now and 2015. As we move from an industrial economy to the "information economy," the changes and challenges will be profound. I believe they will require nothing less than a rewriting of the basic terms and conditions—the "social contract"—that define roles, rights, and responsibilities of employees and employers. The trick for each organization and industry will be to adopt the newer models of employee/employer relationships and to work toward building the human resource policies and practices that conform to a rapidly changing, increasingly competitive environment.

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FINANCIAL REVIEW

1987 EARNINGS DECLINE AS REVENUES AND ELECTRIC OPERATING INCOME INCREASE

Investor-owned electric utility earnings per share (EPS) dropped 4.6 percent from $2.81 per share in 1986 to $2.68 for 1987. A number of regulatory disallowances and other construction-related rate actions resulting in writeoffs caused the earnings decrease. These writeoffs were coupled with changed accounting rules. The majority of the writeoffs were recognized in fourth-quarter results, which saw earnings per share before extraordinary items drop to $.35, a 38.6 percent decrease from 1986's fourth-quarter level of $.57.

Without the effects of writeoffs recorded during 1987, earnings per share before extraordinary items for the industry would have increased by 6.4 over 1986, as sales increased by 4.0 percent and some costs were reduced. Despite the drop in EPS for the year, the quality of earnings improved as non-cash sources decreased and electricity sales for the industry increased.

Income Statement

Electric operating revenue increased from $128.0 billion in 1986 to $130.6 billion in 1987, a 2.0 percent increase. The revenue increase was associated with a 4.0 percent increase in investor-owned KWh sales in 1987 over 1986. Electric operating income increased 5.5 percent from $26.2 billion in 1986 to $27.6 billion in 1987.

Electric operating expenses increased from $101.9 billion in 1986 to $103.0 billion in 1987, an increase of only 1.2 percent compared to the KWh sales increase of 4.0 percent. Decreasing fuel expenditures of 1.5 percent and the impact of the Tax Reform Act of 1986, which caused large decreases in deferred income tax expense and investment tax credits expense, helped hold expenses down. The tax expense decreases will continue to impact the industry in the future with respect to reduced tax costs as well as the loss of internal cash flow arising from these tax items.

The industry operating ratio decreased from 79.6 percent in 1986 to 78.9 percent in 1987 making 1987 the seventh consecutive year of decline for this ratio, evidence of the cost cutting measures which electric utilities are adopting.

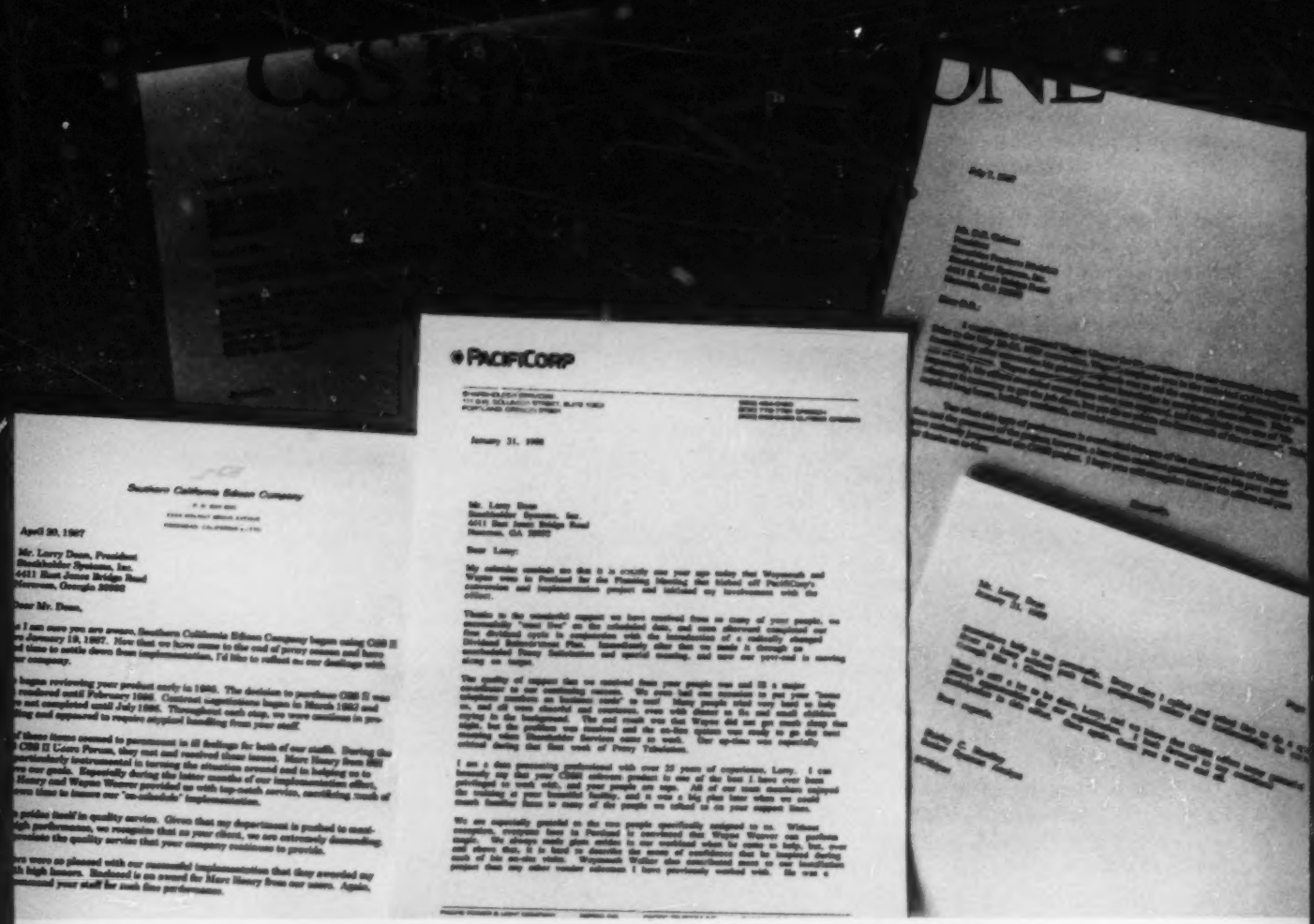
Allowance for funds used during construction (AFUDC) dropped from $6.6 billion in 1986 to $5.0 billion in 1987, a 24.0 percent decline. Completed plants, lower levels of construction, lower interest rates, and writeoffs were primary factors causing the decrease. AFUDC as a percentage of net income available for common declined from 38.0 percent in 1986 to 29.4 percent in 1987. The drop in AFUDC resulted in an improvement in the quality of earnings and also served to reduce the level of book earnings.

The number of companies utilizing an approved phase-in plan increased from 19 in 1986 to 24 in 1987. Phase-in plan accruals as a percentage of net income available for common increased from an estimated 7.8 percent in 1986 to 10.7 percent in 1987, thus somewhat offsetting the quality of earnings improvement that resulted from lower AFUDC levels.

Weaker performance of gas utility operations and the sale of a steam business contributed to the 24.3 percent decrease in other utility operating income from $1.4 billion in 1986 to $1.0 billion one year later.

The regulatory and accounting impacts of recently completed plants caused large line-item fluctuations on the industry's income statement during the year and the fourth quarter of 1987. Also, large fourth-quarter declines in the other income and deductions account, the AFUDC account and the other interest expenses and charges account were related to one company declaring bankruptcy. The line items with the largest fluctuations are as follows:

- Other interest expenses and charges dropped to $118 million during the fourth quarter of 1987, a 57.4 percent decrease over the $277 million in the fourth quarter of 1986. In 1987, one company adopted unregulated industry accounting principles for a plant not in operation. It did not recognize AFUDC, but instead capitalized construction period interest. This amount is included as a reduction (credit) of other interest expense and charges of $169.1 million. Without this accounting change other interest expense and charges would have shown a slight increase.
- AFUDC decreased from $1.5 billion in the fourth quarter of 1986 to $0.9 billion in the fourth quarter of 1987, a 40.1 percent decline.
- There were $2,086 million in writeoffs for 1987 which EEI could determine. Writeoffs of $707 million associated with four nuclear plants were recorded in the fourth quarter. In addition to writeoffs included in other income and deductions for the fourth quarter are the impacts of the company which changed accounting methods and listed $398



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*Source–Business Week 1988 "Top 1000" issue

million as the cumulative effect of an accounting change to shift from AFUDC to capitalized interest. Also included in that line item are the negative impacts of portfolio losses due to the October stock market crash as well as the offsetting positive impacts from strong performances experienced by some unregulated subsidiary operations.

Balance Sheet

The industry's balance sheet improved as six nuclear and six coal units were completed and transferred into plant-in-service. Construction work in progress (CWIP) decreased $24.8 billion during 1987, which represented a 30.9 percent decline over 1986. CWIP as a percentage of plant in service dropped from 28.8 percent in 1986 to 17.7 percent in 1987. The decrease also represents writeoffs related to plants not yet put into service. Associated with this trend was a 12.0 percent increase in utility plant and a 9.9 percent increase in depreciation and amortization expense.

Total capitalization for the industry increased 1.5 percent to $329.2 billion from $324.3 billion. Contributing to the increase were common equity which increased 3.3 percent and long-term debt which increased 1.5 percent. The increase in common equity was due largely to an increased in 1987 retained earnings of 4.9 percent over 1986, which occurred despite the retained earnings decrease of the fourth quarter.

The increase was balanced by the common stock buyback programs of several companies, which reduced common equity. Average common shares outstanding increased by 1.9 percent in 1987. This rate of increase is lower than the 5.1 percent increase experienced in 1986. Most of the increase in shares comes from stock purchase plans such as dividend reinvestment plans. Companies buying back outstanding debt utilizing funds raised by sale-leaseback transactions caused long-term debt to increase less than was expected. Offsetting the increases in debt and common equity was a 7.1 percent decline in preferred stock. This decline is attributed to companies redeeming high cost preference and preferred issues in order to lower financing costs.

Short-term debt showed a 41.3 percent increase of $2.3 billion dollars over 1986. Lower interest rates and the buyback of debt permitted the industry to reduce its embedded cost of long-term debt from 9.6 percent in 1986 to 9.2 percent in 1987. The pre-tax interest coverage ratio (with AFUDC) decreased from 3.11 times in 1986 to 2.96 times in 1987, a 4.8 percent drop.

Despite the poor earnings picture created by plant writeoffs, which decreased earnings and caused three companies to lower their dividend payment rates during 1987, the payment of dividends remained relatively strong for most companies with common dividends declared increasing by 2.6 percent for the year. The dividend payout ratio was 73.5 percent in 1987, up from 70.3 in 1986. This was the fifth consecutive yearly increase for the ratio and the highest it has been since 1980.

Table 1 provides a summary of selected financial ratios and statistics from the 1986 & 1987 industry financial statements. The 1986 sample data are based on company changes and restatements of the data. The types of changes that occurred were restatements caused by retroactive adjustments for approved phase-in plans that affect 1986 and/or 1987 depending on the timing involved with individual cases. One company's quasi-reorganization plan and several companies writeoffs also caused adjustments of 1986 data.

Tables 2 and 3 are based on unaudited reports submitted by a sample of investor-owned electric utilities. The sample is representative of approximately 94 percent of the industry's revenues and 93 percent of its total assets. From this sample, the data were adjusted to represent the entire investor-owned electric utility industry. EP

Table 1
Selected 1987 Financial Data

	1987	1986
Dividend Payout	73.5%	70.3%
Embedded Cost of Long-Term Debt	9.2%	9.6%
Average Book Value	$22.02	$21.52
Book Value, End of Period	$22.27	$21.95
Operating Ratio (Operating expenses to operating revenues)	78.9%	79.6%
Capitalization Ratios:		
Equity	43.4%	42.6%
Preferred	8.4%	9.2%
Long-Term Debt	48.2%	48.2%

Table 2
Investor-Owned Electric Utility Industry Statement of Income
(Millions of Dollars)

	Three Months Ending December 31,			Twelve Months Ending December 31,		
	1987	1986r	% Change[5]	1987	1986r	% Change[5]
Total Electric Operating Revenues[1]	$30,899	$30,704	0.6	$130,630	$128,027	2.0
Electric Operating Expenses						
Fuel	$ 7,389	$ 7,350	0.5	$ 31,700	$ 32,187	(1.5)
Other Operation & Maintenance	10,524	9,774	7.7	38,495	36,194	6.4
Depreciation & Amortization	3,365	2,957	13.8	12,782	11,625	9.9
Costs Deferred under Rate Phase-in Plans	(203)	(248)	(18.1)	(944)	(847)[2]	11.4
Taxes Other Than Income Taxes	2,491	2,351	6.0	9,962	9,525	4.6
Income Taxes: Federal & Other	820	1,126	(27.2)	6,769	6,497	4.2
Deferred Income Taxes	686	1,596	(57.0)	3,744	5,385	(30.5)
Investment Tax Credits, Net	36	(179)	N.M.	529	1,296	(59.?)
Total Electric Operating Expenses	$25,108	$24,727	1.5	$103,036	$101,862	1.2
Electric Operating Income	$ 5,791	$ 5,977	(3.1)	$ 27,593	$ 26,165	5.5
Other Utility Operating Income	253	323	(21.7)	1,043	1,379	(24.3)
Total Utility Operating Income	$ 6,044	$ 6,300	(4.1)	$ 28,637	$ 27,544	4.0
Other Income & Deductions—Net	$ (609)	$ 170	N.M.	$ 605	$ 1,699	(64.4)
Phase-in Deferrals	278	222	24.9	895	511[2]	75.0
Allowance for Other Funds Used During Construction	528	969	(45.5)	3,109	4,238	(26.6)
Total Income Before Interest Charges	$ 6,241	$ 7,661	(18.5)	$ 33,246	$ 33,992	(2.2)
Interest Charges						
Interest on Long-Term Debt	$ 3,658	$ 3,687	(0.8)	$ 14,519	$ 14,970	(3.0)
Other Interest Expenses & Charges	118	277	(57.4)	964	967	(0.3)
Allowance for Borrowed Funds Used During Construction	(380)	(548)	(30.7)	(1,907)	(2,366)	(19.4)
Net Interest Expenses & Charges	$ 3,396	$ 3,416	(0.6)	$ 13,576	$ 13,571	0.0
Net Income Before Extraordinary Items	$ 2,845	$ 4,245	(33.0)	$ 19,670	$ 20,421	(3.7)
Extraordinary Items	(1)	(181)	(99.7)	(138)	(296)	(53.4)
Net Income	$ 2,844	$ 4,065	(30.0)	$ 19,532	$ 20,126	(2.9)
Preferred Dividends Declared	574	657	(12.7)	2,462	2,734	(10.0)
Net Income Available for Common	$ 2,270	$ 3,407	(33.4)	$ 17,070	$ 17,391	(1.8)
Common Dividends Declared	3,123	3,040	2.7	12,542	12,223	2.6
Additions to Retained Earnings	$ (853)	$ 367	N.M.	$ 4,529	$ 5,168	(12.4)
Average Shares Outstanding[3]	6,446	6,347	1.6	6,411	6,293	1.9
Earnings Per Share Before Extraordinary Items[4]	$ 0.35	$ 0.57	(38.6)	$ 2.68	$ 2.81	(4.6)
Earnings Per Share After Extraordinary Items[4]	$ 0.35	$ 0.54	(35.2)	$ 2.66	$ 2.76	(3.6)
Common Dividends Per Share[4]	$ 0.48	$ 0.48	0.0	$ 1.96	$ 1.94	1.0

[1]Revenues are adjusted for intra-industry sales for resale of electricity.
[2]Values for 1st quarter of 1986 were estimated to be $200 million for costs deferred under rate phase-in plans and $100 million for phase-in deferrals.
[3]Adjusted for stock splits.
[4]Based on average shares outstanding as reported to EEI by survey respondents and adjusted for stock splits.
[5]Percent changes may reflect roundings.
r—Revised to reflect company restatements for the 4th quarter of 1986.
N.M.—Not Meaningful.

Table 3
Investor-Owned Electric Utility Industry Balance Sheet
(Millions of Dollars)

Assets	1987	1986r	% Change[3]
Utility Plant[1]			
Utility Plant (Including Nuclear Fuel)	$430,758	$384,524	12.0
Less Accumulated Depreciation	116,569	105,247	10.8
Total	$314,189	$279,277	12.5
Construction Work in Progress	55,548	80,357	(30.9)
Net Utility Plant	$369,738	$359,633	2.8
Investments	10,343	9,737	6.2
Current Assets	41,043	37,617	9.1
Deferred Debits	28,234	24,295	16.2
Total Assets	$449,358	$431,282	4.2
Capitalization & Liabilities			
Capitalization			
Common Stock	$ 91,613	$ 89,367	2.5
Retained Earnings	51,157	48,776	4.9
Preferred Stock	27,763	29,881	(7.1)
Long-Term Debt	159,686	156,282	2.2
Total Capitalization	$329,218	$324,307	1.5
Current Liabilities			
Short-Term Debt	$ 7,883	$ 5,577	41.3
Long-Term Debt Due Currently	5,795	5,169	12.1
Other Current Liabilities	31,876	30,189	5.6
Total Current Liabilities	$ 45,554	$ 40,934	11.3
Deferred Credits			
Capital Lease Obligations, Non-Current Portion	$ 5,077	$ 4,545	11.7
Accumulated Deferred Income Taxes[2]	42,330	36,856	14.9
Accumulated Deferred Investment Tax Credits	17,122	16,660	2.8
Other Deferred Credits	10,057	7,981	26.0
Total Deferred Credits	$ 74,586	$ 66,041	12.9
Total Capitalization & Liabilities	$449,358	$431,282	4.2

[1]Includes non-electric utility plant.
[2]Includes property-related deferred income taxes.
[3]Percent changes may reflect roundings.
r—EEI changed its reporting methodology so that property-related deferred income taxes are now entered as a liability rather than a reduction to plant. Data for 1986 also have been revised due to company restatements.

TECHNOLOGY REVIEW

NATION'S LARGEST SOLAR RESEARCH PROJECT DEDICATED

Photovoltaics for Utility Scale Applications (PVUSA), the nation's largest solar energy research project, was formally dedicated in April at a site ceremony in Davis, CA.

The multiple phase project will evaluate current and emerging photovoltaic systems to determine their economic feasibility for use by utilities in bulk power generation. The project is scheduled for completion in the early 1990s.

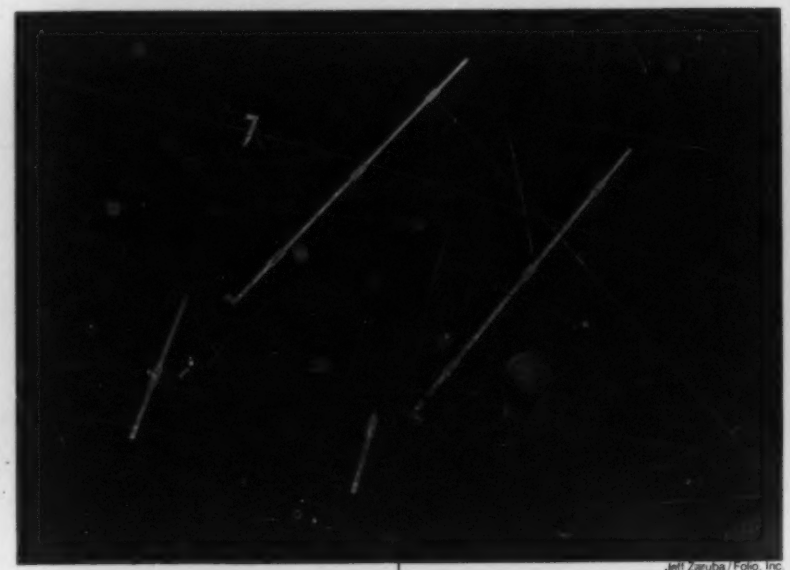
Gregory M. Rueger, Pacific Gas and Electric Company's senior vice president and general manager—electric supply, said, "PVUSA should move us closer to the day when significant amounts of electricity are directly produced cleanly and economically from the energy of the sun."

While the use of photovoltaic cells to produce electricity has a significant history in space vehicles and at remote locations not served by utilities, the technology has not been economic for use by utilities.

PVUSA is a cooperative, national research effort, cosponsored by Pacific Gas and Electric, the U.S. Department of Energy (DOE), the Electric Power Research Institute (EPRI), and the California Energy Commission (CEC).

"Development of the PVUSA project is a stellar example of how government and private industry can work together to successfully harness California's indigenous energy resources," said Charles Imbrecht, Chairman of the CEC.

The DOE committed $8 million toward the first phase of PVUSA, scheduled for completion in late 1990.



Jeff Zaruba / Folio, Inc.

The Davis site will be the project's main test facility. Banks of photovoltaic cells, called arrays, will be tested at a number of electric utility service territories throughout the country as part of the project. In the initial phase of the project, ten different 20-kilowatt technologies will be evaluated for their performance and reliability. In addition, four or five of the most promising technologies will be installed in 200- to 400-kilowatt segments at Davis and other utility sites.

Photovoltaic cells are solid-state semi-conductor devices, usually made of silicon. The cells absorb sunlight, which is converted directly into electric current.

SOLAR CELLS POWER U.S. ENTRY IN SWISS RACE

A car designed and built by Dartmouth College students will compete in the fourth annual running of the Tour de Sol, a six-day race for solar-powered vehicles from Zurich to Lausanne, Switzerland, ending July 3, 1988. The sole power for the vehicle will be generated by standard photovoltaic modules. Power for running during periods of shadow, dim sunlight, or at night will be supplied by silver-cadmium storage batteries recharged by the solar panels during periods of bright sun.

The race is a grueling uphill-downhill test for the solar power capacity and will include an uphill segment run at night. Winners of all three previous runnings have been Swiss; last year's only U.S. entrant in a field of 120 was a team from M.I.T., which finished 15th in its class.

Rules for the race require vehicles to meet the same standards for safety as regular vehicles in Switzerland, including brake and turn lights, horn, and effective brakes. Maximum size is 2 meters by 5 meters, and the rules limit the power panels to 480 watts output and the batteries to 4800 watt-hours capacity.

About 50 students from Dartmouth/Thayer School of Engineering are involved in designing the vehicle, eight of whom will travel to Switzerland for the race as drivers and/or technical support. The vehicle is being designed from the ground up, using readily available materials and technology.

LIGHTING STRATEGY SOUGHT TO SAVE CONGRESS ENERGY DOLLARS

Senators Howard M. Metzenbaum (D-OH) and Tim Wirth (D-CO) are working with the architect of the U.S. Capitol to cut energy costs in lighting Senate office buildings.

"We cannot waste this opportunity to get some free advice that could save the taxpayers a lot of money," said Metzenbaum, who chairs the Senate Subcommittee on Energy Regulation and Conservation.

The two senators have asked George M. White, architect of the capitol, to accept an offer from the National Electrical Manufacturers Association to have lighting designers and manufacturing engineers help design a more efficient lighting plan for the Senate office buildings that will save money.

"During a recent hearing on legislation to promote energy efficiency," said Wirth, a member of the Senate Energy and Natural Resources Committee, "it was pointed out that at least 90 percent of the energy used to light the committee room was given off as waste heat."

"We have the opportunity to enlighten the private sector by showing how much money can be saved by using the most energy-efficient lighting available," Metzenbaum said.

Legislation (S.2167) introduced by Metzenbaum, cosponsored by Wirth, and passed by the Senate at press time, would require that all fluorescent lamp ballasts manufactured after January 1, 1990, meet minimum energy-efficiency standards. Ballasts are mechanisms that regulate the flow of electricity to start and operate fluorescent lamps.

Fluorescent lighting accounts for ten percent of all electricity consumed nationwide. The standards mandated by the bill would reduce peak electricity demand by 67,000 megawatts by the year 2000, which would translate into more than $11 billion in utility bill savings, according to the Natural Resources Defense Council.

By using the Senate buildings to demonstrate how lighting energy costs can be reduced, both senators said the example could help spur companies to adopt similar energy-saving strategies.

"As energy costs have dropped," Metzenbaum said, "Americans have become more complacent about saving oil, natural gas, and other energy resources. We must do more with the technologies available today that reduce our energy bills and build our energy independence."

Wirth also said that the potential for energy savings by the U.S. government is enormous. "The federal government is the nation's leading energy consumer," Wirth said. "In more than 500,000 buildings nationwide, the federal government spends almost $4 billion for energy. Using only the most cost-effective energy-efficiency measures, we could reduce that energy bill by nearly $1 billion."

STATISTICAL REVIEW

1987 ELECTRICITY SALES UP 4.0 PERCENT

Total electricity sales by investor-owned electric utilities grew from 1,808 million megawatthours (MWh) in 1986 to 1,880 million MWh in 1987—a growth of 4.0 percent. This increase was associated with a modest 1.8 percent increase in total revenues and a 2.0 percent increase in the average number of customers. (See Table 1.)

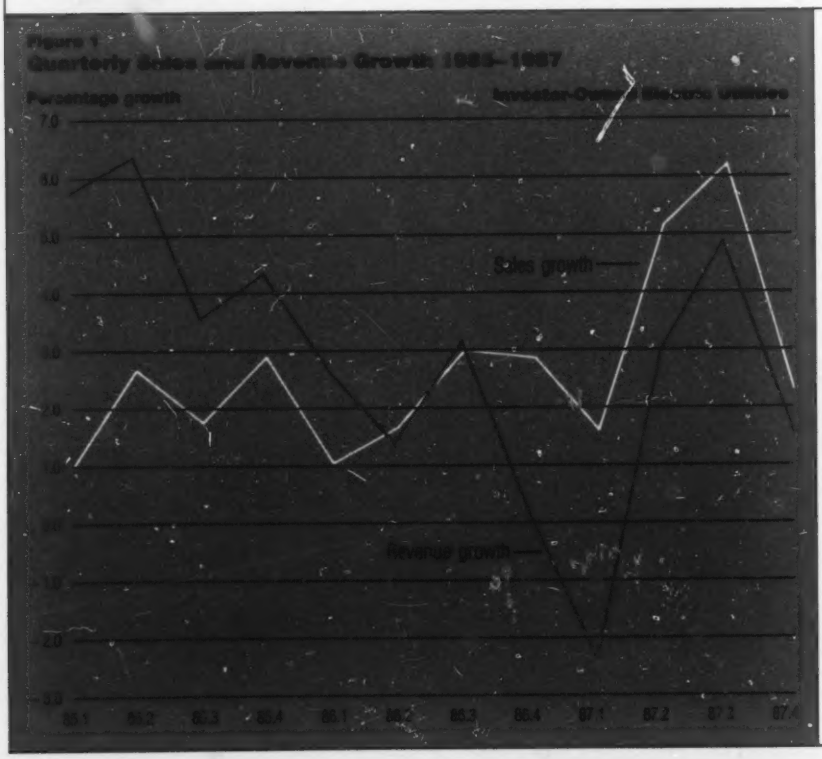
The 1987 sales and revenue growth patterns reflect three major factors:

- Unusually warm spring and summer weather helped boost annual residential sales by 4.1 percent. The 1.9 percent increase in residential customers also helped. Residential sales for the fourth quarter, however, were down 0.3 percent from the same quarter a year ago due to milder weather conditions in the 1987 fall/winter season.
- Increased industrial production and capital outlays helped push growth in real Gross National Product (GNP) and industrial electricity sales to 2.9 and 3.6 percent, respectively. The Federal Reserve Board Index of Industrial Production increased by 3.8 percent during 1987.
- The Tax Reform Act of 1986, stable or decreasing capital costs, lower fuel costs, and increasing use of incentive rates to retain and attract electricity load contributed to the reduction in electricity rates and thus depressed revenue growth.

The fourth quarter of 1987 was the fifth consecutive quarter that growth in electricity sales, on a percentage basis, exceeded the growth in revenues. Figure 1 shows the growth rates of quarterly sales and revenues for all customers; the growth rates are expressed as percentage changes from the same quarter of the previous year.

Table 1
1987 Customer, Sales, and Revenue Data for Investor-Owned Electric Utilities

	Three Months Ended December 31,			Twelve Months Ended December 31,		
	1987	1986	% Change	1987	1986	% Change
Number of Customers						
Residential	70,637,829	69,336,151	1.9	70,153,202	68,852,693	1.9
Commercial	8,784,470	8,519,477	3.1	8,673,299	8,440,080	2.8
Industrial	369,723	366,606	0.9	370,218	369,036	0.3
Street & Highway	129,406	123,695	4.6	127,204	123,340	3.1
Other Public Authorities	148,532	145,911	1.8	146,600	144,675	1.3
Railroads	21	21	0.0	21	22	(4.5)
Interdepartmental	429	445	(3.6)	431	453	(4.9)
Total Customers	80,070,410	78,492,306	2.0	79,470,975	77,930,299	2.0
Electricity Sales (MWh)						
Residential	142,497,880	142,894,004	(0.3)	618,334,474	594,000,612	4.1
Commercial	130,850,964	126,630,875	3.3	542,923,427	518,602,238	4.7
Industrial	166,719,293	159,537,128	4.5	660,249,071	637,147,430	3.6
Street & Highway	2,773,984	2,729,191	1.6	10,381,554	10,345,976	0.3
Other Public Authorities	10,494,314	10,495,040	(0.0)	43,190,837	42,948,199	0.6
Railroads	562,712	575,118	(2.2)	2,241,293	2,261,219	(0.9)
Interdepartmental	456,588	657,438	(30.6)	2,200,591	2,728,924	(19.4)
Total Sales	454,355,735	443,518,794	2.4	1,879,521,247	1,808,034,598	4.0
Revenues ($000)						
Residential	10,863,709	10,771,085	0.9	47,948,468	46,239,781	3.7
Commercial	9,456,306	9,138,445	3.5	39,292,356	38,379,360	2.4
Industrial	7,942,762	7,883,541	0.8	32,258,428	32,621,151	(1.1)
Street & Highway	297,610	289,695	2.7	1,198,165	1,177,866	1.7
Other Public Authorities	562,710	568,473	(1.0)	2,321,122	2,334,092	(0.6)
Railroads	35,778	38,272	(6.5)	147,336	156,846	(6.1)
Interdepartmental	23,073	39,186	(41.1)	135,646	162,947	(16.8)
Total Revenues	29,181,948	28,728,697	1.6	123,301,521	121,072,043	1.8



The average total number of ultimate customers grew from 78.5 million in the fourth quarter of 1986 to 80.1 million in the fourth quarter of 1987, representing a growth of 2.0 percent.

The highest revenue growth came from the commercial sector with a rate of 3.5 percent, followed by the residential sector at 0.9 percent and the industrial sector at 0.8 percent.

Industrial sales grew 4.5 percent from the fourth quarter of 1986, reflecting, in part, the highest U.S. industrial capacity utilization rate experienced since March of 1980. The growth in industrial sales was also attributable to high capacity utilization by some electric-intensive industries, as well as an increase in exports. Despite this large sales growth, industrial revenues grew only by 0.8 percent.

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REGULATORY REVIEW

1987 RATE DECREASES TOP ONE BILLION DOLLARS

The electric utility industry experienced two significant events in terms of electric rate actions during 1987. First, rate decrease amounts surpassed the one billion dollar mark for the first time. Public utility commissions approved an annualized $1.44 billion in electric rate decreases during 1987—nearly a 280 percent increase over the $383 million approved in 1986.

Second, the fourth quarter of 1987 represents the first quarter in which approved rate decrease amounts exceeded rate increase amounts. Rate decrease amounts reached $499 million, 111 percent higher than the $236.9 million of decreases approved during the fourth quarter of 1986. The average rate decrease per rate order for the fourth quarter and the year were $15.1 million and $12.3 million, respectively.

Rate increase amounts totalled $431.8 million during the quarter on an annualized basis, leading to a total $2.3 billion of 1987 rate increases. The average rate increase per rate order dropped from $27.7 million in 1986 to $26.8 million for 1987.

Many rate decrease amounts approved during the fourth quarter were from companies taking advantage of a Federal Energy Regulatory Commission order allowing abbreviated rate filings for utilities that voluntarily reduce their rates to reflect the decrease in the Federal income tax rate. Lower rates of return on equity granted by commissions, state tax-related rate decreases, as well as filings for industrial incentive rates generally account for the remaining rate decrease amounts.

Increases Approved

During 1987, $2.3 billion in rate increases were approved, a 20 percent decline from the 1986 increase amount of $2.9 billion. Fourth quarter increases were down substantially from the amount approved during the same quarter a year ago, decreasing from $688.5 million to $431.8 million—a 37.3 percent drop. The fourth quarter average rate increase per rate order was also down from a year ago, decreasing from $29.3 million in the fourth quarter of 1986 to $13.1 million in the fourth quarter of 1987.

Decreases Filed

Decrease filings for 1987 amounted to $587.2 million, nearly a four-fold increase over the 1986 amount of $116.8 million. By comparison, rate decrease filings for 1983 totalled only $0.6 million. Fourth quarter filings of decreases amounted to $180.1 million, which was nearly triple the $62.8 million filed in the fourth quarter of 1986.

Increases Filed

Rate increase filings for 1987 totalled $5.3 billion, representing a 39 percent increase over the 1986 amount of $3.8 billion. A significant portion of the increase amount filed is attributable to a number of companies that sought rate recognition for newly completed generating plants. Fourth quarter rate increase filings were $293.7 million. Approximately $996.5 million in rate increases were denied by utility commissions during the year.

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Table 1
Annual Electric Rate Actions
Five-Year Summary: 1983–1987

	1983		1984		1985		1986		1987	
	Number of Actions	Total $ Amt. ($000)	Number of Actions	Total $ Amt. ($000)	Number of Actions	Total $ Amt. ($000)	Number of Actions	Total $ Amt. ($000)	Number of Actions	Total $ Amt. ($000)
Filed During Period (1)										
Increases	186r	12,782,882r	121r	7,524,201r	137	8,309,574r	73r	3,758,092r	47	5,326,790
Decreases	3r	588r	2	8,269	4	27,092	9	116,815	46	587,189
Pending at End of Period (2)										
Increases	147	9,673,524	103r	7,887,199r	127r	8,119,686r	82	4,101,029r	53	5,550,868
Decreases	0	0	2	8,258	0	0	8	62,815	24	301,867
Approved During Period										
Increases	241r	5,373,391r	186	4,745,036	127	4,686,710	104r	2,880,901r	86	2,304,268
Decreases	17	59,080	19	175,045	17	129,678	21	383,038	117	1,441,823
Withdrawn During Period										
Increases	7	187,667	3	158,990	2	83,268	7	589,004	2	22,050
Decreases	0	0	0	0	1	305	0	0	1	10,005
Denied During Period										
Increases	10	582,695	7	451,178	6	419,045	14	903,441	10	996,458
Decreases	0	0	0	0	0	0	0	0	0	0

(1) Does not include changes filed and either approved, withdrawn or denied during same quarter.
(2) These figures are not in addition to the corresponding filed figures.
r = revised
This tabulation represents companies which have reported on a quarterly basis to EEI.

State commissions approved an average of 26.8 percent of the amounts requested by utilities in their rate increase filings during the fourth quarter of 1987. This is an historically low number and down from the 42 percent approved for the fourth quarter of 1986.

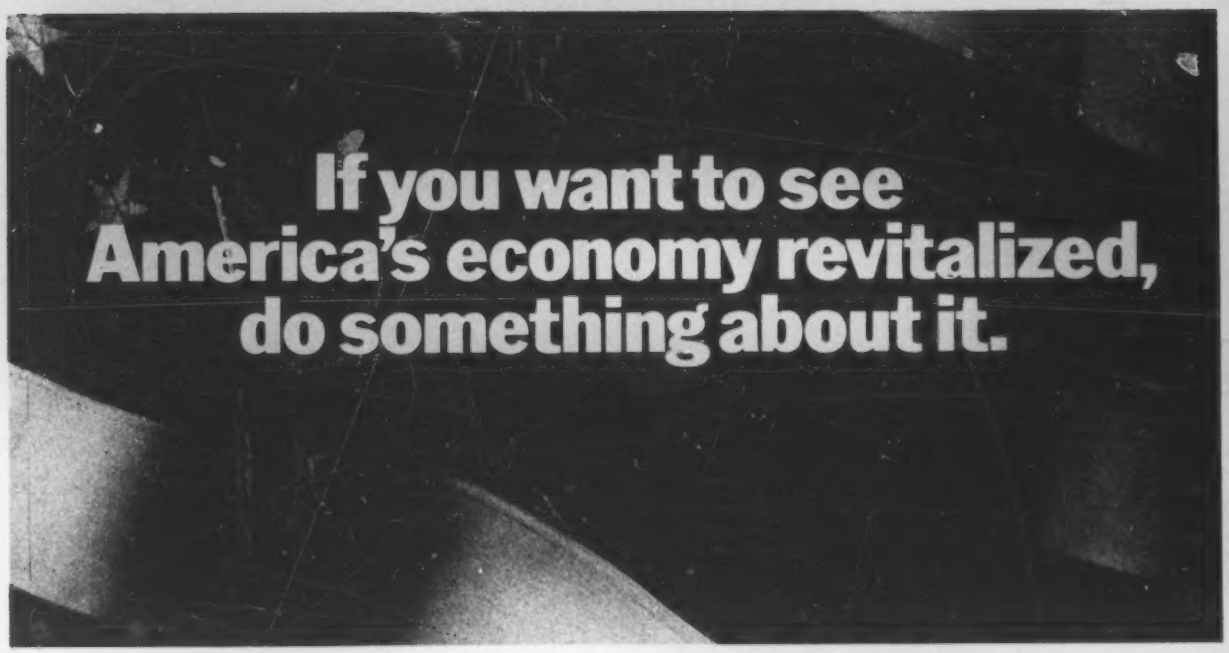
Other Actions

The estimated regulatory lag for the fourth quarter of 1987 averaged 10.2 months, while for the third quarter of 1987, regulatory lag averaged 9.2 months. Regulatory lag stood at only 7.2 months during the fourth quarter of 1986.

Allowed returns on common equity for cases decided by state commissions decreased from 13.01 percent during the third quarter of 1987 to 12.78 percent during the fourth quarter. The Edison Electric Institute estimates that electric utilities requested an average return on common equity of 13.25 percent during the fourth quarter.

Rate actions during 1987 highlight an important new trend for rate making activity in the industry: full-blown rate case proceedings are being replaced by abbreviated rate filings that seek regulatory approval for innovative rate structures, incentive rates, and bulk power purchase agreements. Utilities are utilizing innovative rates in order to retain and attract new load. This trend towards innovative rates is expected to continue due to the increasing impact of competitive pressures resulting from non-utility power producers and the threat of customer self-generation.

Table 1 represents a five-year summary of electric rate actions. It reflects the results of the EEI Quarterly Rate Action Survey, which is compiled by the EEI Rate Regulation Department. The Survey is based on replies received from investor-owned electric utilities to a standard questionnaire. Approvals are reported in the quarter in which the rate change goes into effect. As a result, if a commission orders a phase-in rate increase, the total dollar amount of all phases of the increase is reported in the quarter in which the commission order is issued.



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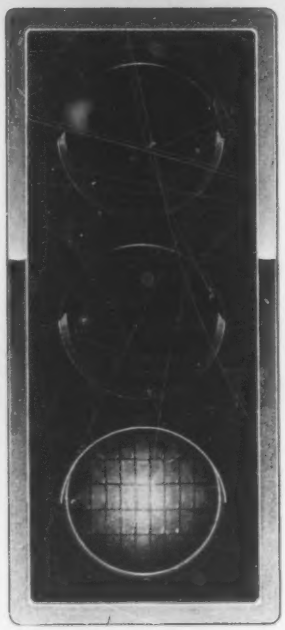

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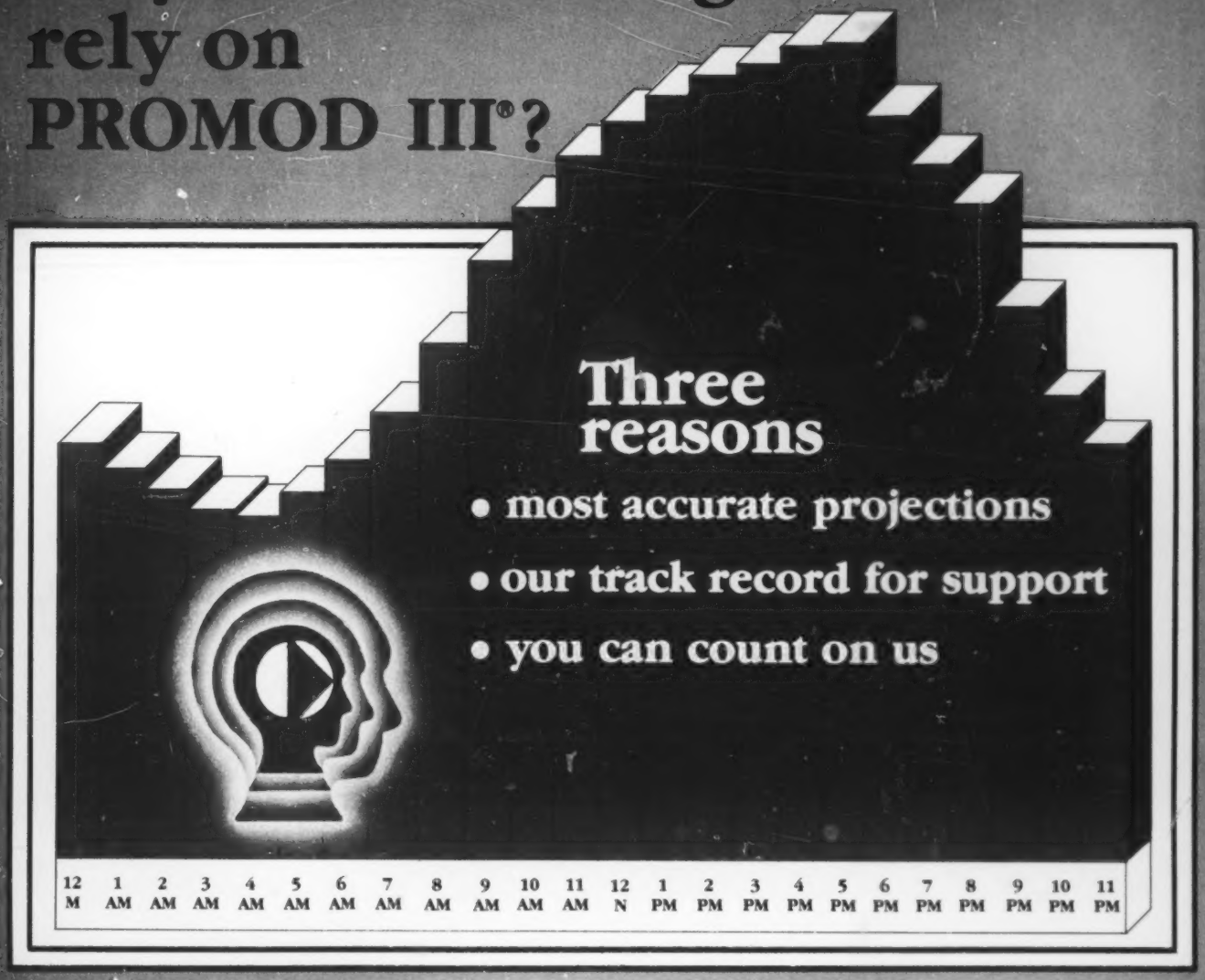
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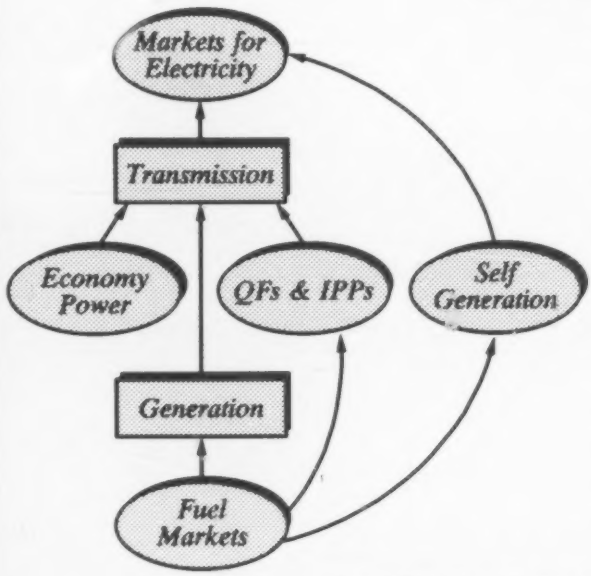

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Service Quality: A Unique Challenge for Energy Utilities

As competition intensifies, so too must utilities' commitment to providing customers the highest quality of services possible.

How many times has this happened to you?

You are put on hold for what seems like forever when you call your travel agency? Perhaps you hang up out of frustration.

You are "bumped" from a flight or told by a restaurant that you cannot be seated until 45 minutes after the time of your reservation?

You drop off your vehicle for service or try a new restaurant and encounter rude or uninformed service personnel.

Or, in contrast, you are impressed with not only the technical skills of the employees of a service firm but also their concern for you as an individual. They seem to care about you as a person.

How have you reacted to such experiences?

Have you become aggravated with firms that don't deliver quality service and vowed not to patronize them again? A common answer is "Quite likely."

Have you switched suppliers because of what you perceive to be poor quality service? You probably are thinking "Sometimes."

Have you become more loyal to firms that deliver top-quality service? If you're like most customers, the answer is "Probably."

Could your company's name be inserted into the bad or good examples? For example, "bumping" customers from your daily schedule of installing time-of-use meters? Or, conversely, dealing with a customer's problem in a timely and thorough fashion?

The issue illustrated by these examples is the quality of your service. Service quality is increasingly important to customers: according to a recent Whirlpool Corporation study, "nearly four out of every five American consumers claim to be more demanding about quality now than in prior years."[1] Yet according to no less an authority than Tom Peters, co-author of *In Search of Excellence*, "In general, service in America stinks."[2]

Given the growing importance of quality to consumers and the apparent lack of it in the U.S. marketplace, service quality is (or should be) increasingly important to business firms. In light of this trend, there are four questions you should consider: What are the implications of viewing energy as a service? What does service quality mean to your utility? What is service quality and how is it judged by your customers? How can service quality be achieved, maintained, and perhaps even improved in your utility?

Energy as a Service—Why is this Important?

Your customers do not see and are seldom concerned about energy's physical properties. Energy, to consumers, is intangible. They do not purchase energy for its own sake but rather to operate an appliance or device. In their minds, they are not buying gas or electricity but air conditioning, process heating, or television. In short, they are buying a service, not a good.

This distinction is important because services themselves have several distinctive characteristics:

Intangibility. This most important characteristic pertains to customers' inability to see, feel, taste, or touch services in the same manner they can goods.[3] Examples include education and, as explained previously, electricity.

Labor intensity and nonstandardization. Many services are produced by people rather than machines. The extensive involvement of people in the production of a service makes it difficult for a firm to provide consistent performance and quality with a service.[4] Examples include hair cutting and, in the utility context, service restoration after an outage.

Inseparability of production and consumption. Whereas tangible goods are produced, sold, and then consumed, services are sold, then produced and consumed.[5] Although this attribute really does not apply to energy, your core service, it definitely applies to your complementary services. As Zeithaml stresses, "Because of this inseparability, the buyer usually participates in producing the service, thereby affecting the performance and quality of

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Robert Rafal Foto

"You only have one chance to make a **good first** impression"—and everything **counts**, from technical competence to **physical** appearance.

Consumers evaluate services differently than they do goods. Suffice it to say that as a result services marketers must communicate with consumers in different ways and with somewhat different messages than do goods marketers.

the service."[6] Examples include a patient's providing information about his or her ailment to a doctor so an accurate diagnosis can be developed and, in the utility context, a customer's providing information about his or her household energy use so the causes of an unusually high bill can be diagnosed.

In turn, these characteristics of services pose special marketing challenges.[7] For example, due to intangibility and other factors, "consumers must rely on different cues and processes when evaluating services"; that is, consumers evaluate services differently than they do goods. Suffice it to say that as a result services marketers must communicate with consumers in different ways and with somewhat different messages than do goods marketers. Also, when purchasing services rather than goods, consumers seem to "seek and rely to a greater extent on personal sources." These sources include friends, relatives, co-workers, and business managers. At the same time, consumers tend to use the physical evidence as a cue for judging quality when purchasing services. Such physical evidence includes the building where the service firm is located, equipment used to produce the service, and the appearance and attitudes of the personnel who come in contact with customers.

Service Quality—What Can It Do for Your Utility?

Basically, if service quality is poor, it can hurt your firm; if it's excellent, it can benefit your utility—including the bottom line. Service quality can affect your firm in several specific ways.

On the negative side, if they have alternative suppliers, customers who experience poor service quality may switch suppliers. According to statistics presented at a seminar by a Disney Company executive (but not restricted to Disney operations), 91 percent of dissatisfied customers don't repurchase. Furthermore, according to research reported by Ernst & Whinney, 60 to 90 percent of dissatisfied customers switch stores or brands.[8]

In addition, consumers like to talk about service quality with

To most people electricity is intangible. They think of it not in terms of what it is but in terms of what it does for them—things like heating their homes and powering their TVs and VCRs.

Dave Schaefer / Uniphoto

friends, relatives, and business associates and, in so doing, may attract or drive off customers for your utility. Again, according to Ernst & Whinney, "96% of dissatisfied customers never complain to the company." However, according to the Disney executive, a dissatisfied customer tells nine other people about the experience. In other words, word-of-mouth communication is particularly important in the case of poor service quality, especially when good service is taken for granted and not communicated effectively to customers.

On the positive side, excellent service quality can build loyal customers and provide opportunities for cross-selling of services. Conversely, poor service quality can hurt your diversification efforts.

Finally, given that service quality is relatively absent in the U.S., firms that provide it can gain an advantage over their competitors, an advantage that grows in importance as competition intensifies. To cite a prominent example, "Seattle-based Nordstrom's has turned exacting standards of customer service into a billion-dollar annual business."[9] In fact, many (maybe most) of the tremendously successful service firms have reputations for providing top-caliber service quality. Disney and Federal Express are two well-publicized examples.

Service Quality—What Is It and How Is It Judged?

The important perspective on service quality is your customers', and they judge it by comparing their

perceptions of the actual service experience with the expectations they held before the service was provided.[10] To put this statement into context, just think of your movie-going experiences. Have you ever heard from friends that a movie was great, a "must see," but found that you were disappointed when you saw it? You may have been disappointed (if not dissatisfied) because your expectations going into the movie were too high.

The process by which service quality is judged can be summarized in a simple model like the one in Figure 1. The presence or absence of a gap between perceptions and expectations indicates the degree of service quality. If there is no gap (that is, expectations equal perceptions), acceptable service quality exists. If perceptions do not meet expectations, then we have a situation of *un*acceptable quality.

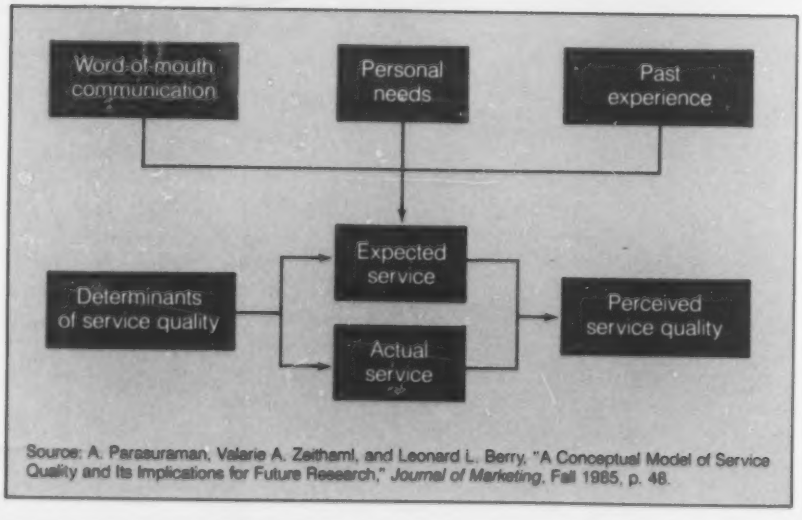
Lastly, if there is a favorable gap (that is, perceptions of the actual experience surpass expectations), then ideal quality exists. Note that this is "ideal quality" from the customer's perspective. It is not necessarily ideal from the firm's perspective because the firm may be delivering more quality than is necessary and wasting resources to do so.[11]

It is also important to note that customers judge not just the service outcome (what is provided) but also the service process (how it is provided).[12] In research about service quality, a large number of comments in focus groups relate "to the *interpersonal behaviors* of the service provider, such as politeness, willingness to help, trustworthiness. . . . The manner in which the service is performed can be a crucial component of the service from the consumer's point of view."[13] For example, when you go to a car wash, you are concerned not only with how clean the car is after the wash but also with how the car is handled by the attendant. You care about process as well as outcome.

It is also important to note that customers judge not just the service outcome (what is provided) but also the service process (how it is provided).

Figure 1

A Simplified Model of Service Quality



Source: A. Parasuraman, Valarie A. Zeithaml, and Leonard L. Berry, "A Conceptual Model of Service Quality and Its Implications for Future Research," *Journal of Marketing*, Fall 1985, p. 48.

Table 1

Determinants of Service Quality

Reliability— **Consistency of performance and dependability**
Accuracy in billing
Keeping records correctly
Performing service at designated time
Responsiveness— **Willingness or readiness of employees to provide service**
Calling customer back quickly
Giving prompt service
Competence— **Possession of required skills and knowledge to perform the service**
Contact personnel
Operational support personnel
Research capability
Access— **Approachability and ease of contact**
Easily accessible by phone
Waiting time is not extensive
Convenient hours of operation
Convenient locations
Courtesy— **Politeness, respect, consideration, and friendliness of contact personnel**
Consideration for consumer's property
Clean, neat appearance of personnel
Communication— **Informing customers in understandable language and listening to them**
Explaining the service itself
Explaining how much the service costs
Explaining service versus costs trade-offs
Assuring consumer problem will be handled
Credibility— **Trustworthiness, believability, honesty**
Company name
Company reputation
Personal characteristics of contact personnel
Degree of hard sell
Security— **Freedom from danger, risk, doubt**
Physical safety
Financial security
Confidentiality
Understanding/Knowing Consumer— **Making the effort to understand consumer's needs**
Learning consumer's requirements
Providing individualized attention
Recognizing regular customers
Tangibles— **Physical evidence of the service**
Physical facilities
Appearance of personnel
Tools or equipment used to provide service

Source: A Parasuraman, Valarie A. Zeithaml, and Leonard L. Berry, "A Conceptual Model of Service Quality and Its Implications for Future Research," *Journal of Marketing*, Fall 1985, p. 47.

Recent research suggests that consumers use one or more of ten different criteria in evaluating service quality. The criteria, presented in Table 1, obviously overlap to some degree, and their relative importance almost certainly varies across market segments, time periods, etc. The research that identified these criteria focused on financial services and product-repair services. Nevertheless, you can see that the criteria are applicable to utility services.

Service Quality—How Can You Improve It?

As a top executive from ITT has emphasized, "In a service industry, the secret of success is recognition that customer-contact personnel are the key personnel in the organiza-

tion. . . . In a successful service organization, the organizational chart is turned upside down, with the customer-contact personnel on top."

The critical importance of customer-contact personnel simply cannot be emphasized too strongly.

So, how can you help these all-important people improve their performance? Recognizing, of course, that the challenge of providing first-rate services is a never-ending one, we offer ten suggestions that may prove helpful.

■ *Consider the possibilities of job enlargement.* In our view, performance is determined by a worker's motivation, abilities, work environment, and knowledge. As a manager, you need to take steps to influence these four factors positively in order to achieve high levels of performance related to service quality.

At present, it is difficult to motivate many service workers. Among the problems is the fact that many service jobs have become too narrow and quite mundane (e.g., only scheduling reservations or responding to complaints). The motivation of employees may be improved by enlarging the scope of jobs by adding related tasks to a person's job description.

■ *Conduct additional communications-skills training for customer-contact personnel.* As a car-rental clerk commented, "The computer training was real good. I know how to do all this technical stuff, but nobody prepared me for dealing with all these different types of people."[14]

The message is clear: employees who come into contact with customers need training related to handling customers, not just tasks

Henley & Seager (Lincoln)

By assigning key customers a senior executive who acts as their "personal banker," a utility demonstrates to employees and customers alike its commitment to providing superior service.

and equipment. Consider the fine example set by L. L. Bean, the outdoors products retailer that has thousands of telephone contacts with customers daily: "Bean employees receive 40 hours of training before they deal with their first customer. Much of the instructional emphasis is on care and thoroughness in filling orders and on general courtesy and helpfulness."[15] You should also remember that long-time employees need to receive periodic "refresher courses."

■ *Engage in internal marketing.* The meaning of and rationale for this activity has been explained as follows:

> Internal marketing means applying the practices and philosophy of marketing to the people that serve the external customer so that (1) the best possible people can be employed and (2) they will do the best possible work . . . By satisfying the needs of its internal customers, an organization upgrades its capability for satisfying the needs of its external customers.[16]

Specifically, you need to consider employees' needs when designing jobs, training programs, and compensation plans.

■ *Deal with customers as individuals to the extent possible and appropriate.* It simply is not necessary or cost-effective to provide high levels of individualized service to all customers. However, with customers who are important to you (e.g., those who are particularly susceptible to switching to another energy supplier), individual treatment can be both necessary and cost-effective.

One form of individual treatment is customization of the service to some extent. This may apply to the delivery of your core service, energy, or to the form and delivery of complementary services such as energy audits. Before moving into customization, you need to consider carefully all the pro's (e.g., increased customer satisfaction) and con's (e.g., greater variability of quality, added costs).

A second form of individual treatment is the "personal banker" concept that has swept the country. Under this program, selected customers are provided with the name of a company employee who is their main contact person with the organization. The "personal banker" will get to know them and their needs, try to satisfy them, resolve any problems the customer encounters, and—in general—try to ensure the customer's satisfaction. In our opinion, this approach warrants serious consideration for selective utility customers, notably large commercial and industrial accounts and especially those susceptible to switching energy sources.

A related idea is to use senior executives as "personal bankers" for key accounts. In this way, customers (as well as customer-contact employees) can see the organization's commitment to quality service and the executives can empathize with the challenges faced by customer-contact employees in providing quality service.

■ *Use advertising (print and broadcast ads, direct mail, and statement stuffers) for special purposes related to service quality.* Advertising should be designed to "stimulate and simulate word-of-mouth communication (e.g., through testimonial advertisements or by developing advertising high in conversational value)."[17] This use of advertising recognizes that personal sources tend to be particularly important in the purchase of services.

A second purpose of advertising should be to reduce customers' concerns about service quality by describing important quality controls

Kenneth L. Miller/Unophoto

Employees who come in contact with customers need excellent "people skills" as well as technical knowledge about their company's programs and services. Training can help in both areas.

Because a service is a performance and cannot be sensed as goods can, consumers tend to be especially attentive to intangibles associated with it for clues about its nature and quality.

employed by your utility. An example might be explaining power conditioning to provide "clean" energy free of sags and surges. Such advertising also might put to rest any concerns consumers have about safety issues.

Another purpose of advertising should be to help create reasonable expectations on the part of consumers. This is best accomplished by resisting the temptation to overpromise. Promising something that you cannot deliver can create a service-quality "gap" between customer perceptions and expectations.

■ *Review the quantity and quality of your consumer education materials.* In particular, are they consistent with your present objectives? In many respects, they can help you accomplish the same special purposes just discussed.

Consumer-education brochures also can help shape customers' perceptions of service quality by explaining the rationale for certain policies (e.g., new-customer deposit requirements) that tend to be misunderstood by or aggravating to customers.

■ *Manage the "evidence" connected with the service.* The rationale for and process of managing evidence have been explained in this way:

> Because a service is a performance and cannot be sensed as goods can, consumers tend to be especially attentive to tangibles associated with it for clues about its nature and quality. . . . Managing evidence means making sure that these tangible objects convey the proper clues. . . . The tangibles to be managed could include the physical service facility, the appearance of service providers, devices or equipment used in performing the service, account statements, and the firm's logo.[18]

In many respects, this recommendation addresses the axiom, "You only have one chance to make a good first impression."

■ *Synchronize supply and demand.* In addition to load management techniques related to your core service, there are opportunities to synchronize supply and demand for your complementary services—opening accounts, in-person payment of bills, discussing high-bill complaints, conducting energy audits, etc.

Berry describes two approaches for synchronizing supply and demand.[19] One approach involves reshaping demand by pricing incentives, such as lowering prices for installing water heater wraps on certain slack days of the week, and by customer education, such as promoting the added convenience that can be gained by requesting the service during slack time periods.

The second approach involves altering supply capacities to better match demand patterns by supplementing your employees with productivity-enhancing equipment such as bill-payment machinery, public-access information terminals, and PCs; by using part-time employees to supplement your full-time customer-contact personnel; and by cross-training employees so that they can switch temporarily to a different function in times of peak demand.

■ *Follow up with customers to assess service quality.* Such follow-up can accomplish many purposes: measuring changes over time in customers' perceptions of service quality; reassuring customers about your commitment to quality service; and "defusing" dissatisfied customers (and perhaps gaining a second chance to satisfy them).

Several techniques for following up should be considered. You could visit or call recent customers. You could conduct periodic surveys of customers to measure their levels of satisfaction with the quality of both

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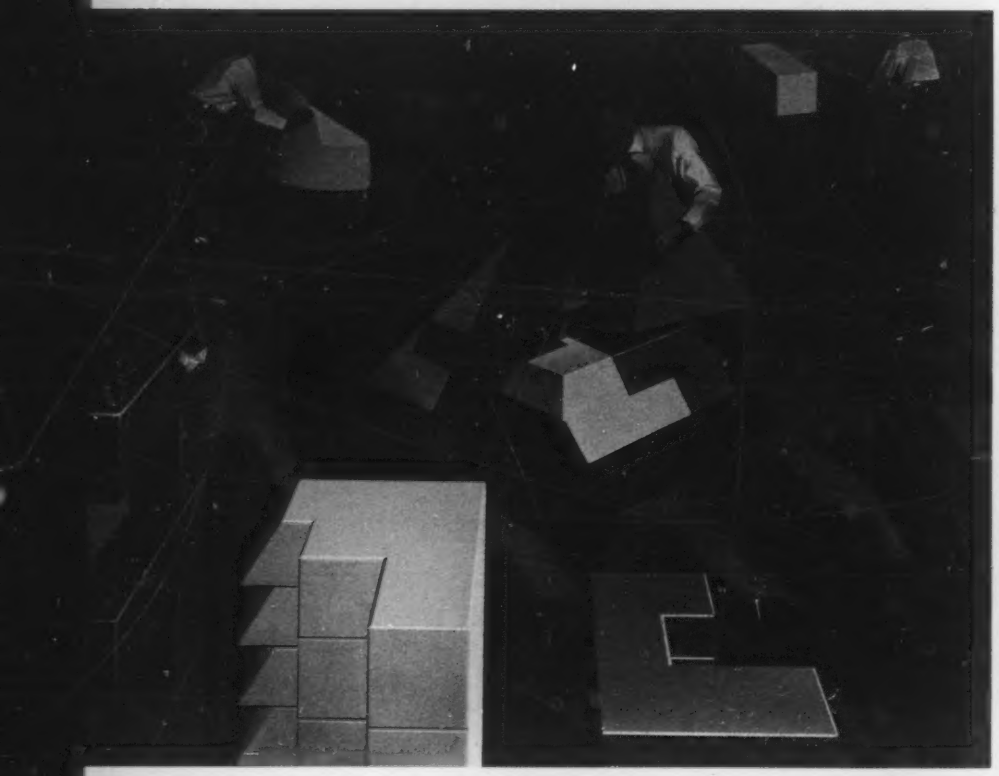

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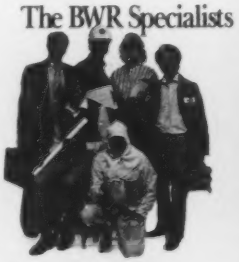

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your core service and selected complementary services and as a basis for comparison against alternative service providers. You could provide customers with a telephone number, toll-free if necessary, to use when they have questions, complaints, compliments, and/or suggestions.

■ *Sow the seeds of a service culture within your utility.* Having a service culture means that quality is highly valued within your own organization and that it is stressed in visible and meaningful ways.[20] Obviously, this requires a top-management commitment—you cannot just walk out in the hall and announce that you are instituting a service culture! However, given the utility industry's increasingly competitive arena, top executives in utilities are growing more aware of the need for and benefits of developing a service culture—or, for that matter, any other initiative that will provide a competitive advantage and bottom-line improvements.

Each individual manager can help its utility move toward a service culture by doing three things: make top-quality service a reality in your area of responsibility; demonstrate commitment by personally dealing with visible service opportunities; and discuss the nature, benefits, and techniques of service quality with your colleagues and, when the opportunity arises, with top management.

Undoubtedly, there are other steps you can take to improve the abilities, motivation, knowledge, and work environment of your customer-contact personnel. The point is that when you achieve top-quality service, you will have a generally satisfied group of customers. Satisfied customers, in turn, give you a competitive advantage that is difficult, if not impossible, for others to beat. ■

Notes

1. Leonard L. Berry, Valarie A. Zeithaml, and A. Parasuraman, "Quality Counts in Services, Too," *Business Horizons*, May/June 1985, pp. 44-52.

2. "Pul-eeze! Will Somebody Help Me?" *Time*, February 2, 1987, pp. 48-53 and 55-57.

3. Valarie A. Zeithaml, "How Consumer Evaluation Processes Differ Between Goods and Services," in James H. Donnelly and William R. George, eds., *Marketing of Services* (Chicago: American Marketing Association, 1981), pp. 186-190.

4. See "Pul-eeze!" and Berry, Zeithaml, and Parasuraman.

5. W.J. Regan, "The Service Revolution," *Journal of Marketing*, July 1963, pp. 57-62.

6. See Zeithaml.

7. See Zeithaml.

8. Dale R. Harley, "Customer Satisfaction Tracking Improves Sales, Productivity, Morale of Retail Chains," *Marketing News*, June 22, 1984, p. 15.

9. See "Pul-eeze!"

10. See Berry, Zeithaml, and Parasuraman.

11. Linda J. McAleer and Thomas Dukich, "Customer Satisfaction: Key to Improved Service Planning," *Public Utilities Fortnightly*, June 13, 1985, pp. 40-43.

12. A. Parasuraman, Valarie A. Zeithaml, and Leonard L. Berry, "A Conceptual Model of Service Quality and Its Implications for Future Research," *Journal of Marketing*, Fall 1985, pp. 41-50.

13. See Berry, Zeithaml, and Parasuraman.

14. See "Pul-eeze!"

15. See "Pul-eeze!"

16. Leonard L. Berry, "Services Marketing Is Different," *Business*, May-June 1980, pp. 24-29.

17. See Zeithaml.

18. See Berry, Zeithaml, and Parasuraman.

19. See Berry.

20. See Berry, Zeithaml, and Parasuraman.

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Women at Work

They make up almost half of the U.S. workforce. Aren't human resource policies that help them reconcile conflicting job and family responsibilities simply good business sense?

The era of *Father Knows Best*—a time in American society when families typically included one breadwinning father who headed the household, one nurturing but unremunerated female homemaker, and their 3.7 children—is history. Welcome to the 1980s, the decade of *Kate and Allie* and *thirtysomething*, a period characterized by dramatic increases in the number of working women.

Profound demographic and labor force changes over the past thirty to forty years have created a U.S. workforce of a decidedly different complexion than the workforce of the 1950s. Today, women constitute nearly half of the U.S. labor force. The number of American women between the ages of 16 and 64 working for pay has almost tripled in less than four decades—from 18 million in 1950 to 53 million in 1987. The growth has been most dramatic among women in their prime childbearing years: by 1987 women between the ages of 25 and 34 years represented 72 percent of all working women, up from 34 percent in 1950.

Moreover, demographic projections tell us that women, minorities, and immigrants will continue to represent an increasing percentage of new entrants in the U.S. workforce through the end of the century. According to the Hudson Institute, native and immigrant females together will constitute 65 percent of new workforce entrants between 1985 and 2000.

This influx of women in the workforce has forced business to consider what Irene Natividad, Chair of the The National Women's Political Caucus, calls "workplace investments," those employee benefits related to family issues—child care, disability and parental leave, flexible work schedules, etc.—that formerly it had deemed a worker's personal responsibilities.

Child Care

In 1987, almost 65 percent of all women with children under the age of 18 worked outside their homes. No wonder, then, that the hottest family issue for today's voting population is child care, an issue that the *Washington Post* calls "the emblematic issue of the 1988 campaign," one that has "given new electoral clout to working mothers."

That new-found clout reflects the growing numbers of mothers entering the labor force. According to Wider Opportunities for Women, 21 million mothers were in the labor force last year. And, somewhat surprisingly, "the most rapid increase in the rate of labor force participation since 1970 has been among women with children under 3 years old: in 1987, 53 percent of those mothers were in the workforce, up from 26 percent in 1970.

With more mothers working than not, politicians are paying increasing attention to their workplace concerns. According to Irene Natividad, "Issues like child care are 'sexy,' " because "of the plurality of the women's vote. In 1984, six million more women voted than men. In 1988, projections are that eight million more women than men will vote. Voting strength not only empowers women, it lends weight to the issues that will determine that vote." Jill Miller, Executive Director of the Displaced Homemakers Network, concurs: "The demographics are catching up with us, and voting will bear this out. Women vote more about social issues, while men tend to vote about defense issues. Social issues are going to be a major campaign focus in this election."

Joan Bronk, National Vice President of the National Council of Jewish Women, prefers to think of many of the social concerns that typically get lumped together as women's issues—child care assistance, job-protected medical leave for maternity, parental leave, workplace flexibility, welfare reform, increasing the minimum wage, etc.—as "family issues that should be of equal importance to men. It is reasonable to assume that changing patterns of family life should concern husbands and fathers as much as wives and mothers since the resolution of many of these concerns will directly influence their children's lives and the quality of family life in this country." Judith Lichtman, Executive Director of The Women's Legal Defense Fund, agrees, "This country needs a stable workforce, and such a workforce can best be addressed through an 'equality model' of 'sex-neutral' policies."

With so many mothers working, the issue of child care is also of

Norm Rubenstein is Director of Information and Publishing Services at Edison Electric Institute.

Larry Ruggeri/Uniphoto

In 1970, about a quarter of U.S. women with children under the age of three worked outside their homes. Today, more than half do.

Bob Daemmrich / Uniphoto

With almost two of every three mothers working outside the home, child care has become "the hottest family issue for today's voting population."

growing importance to American business. According to Joanne Howes, Executive Director of The Women's Vote Project, "many women juggle the responsibilities of chief caretaker in the home with those of working outside the home. And, whether they have careers, or, as is more often the case, traditional 'pink-collar' or clerical jobs, at times they find it extremely hard to balance everything." The resulting tension is not unique to women who work of necessity, single-handedly supporting themselves and their children. It also plagues any woman whose desire to work may compete with an equally strong desire to be the full-time care provider for her children.

A major factor that exascerbates this tension and may have negative impacts on a working mother's productivity is the quality and affordability of child-care services available to her. (Interestingly, some men also report greater workplace distractions when their wives delegate caretaking responsibilities and return to work.) Nor do these concerns automatically evaporate as the child matures from infancy to adolescence. Many working mothers, particularly parents of "latch-key children" who supervise themselves after school each day, suffer from "three o'clock syndrome," a point at which their attention is divided between their work and their concerns about their children.

Such distraction can be costly to business. Equally costly are the productivity losses associated with parental absenteetism or tardiness. Mothers who shoulder the entire caretaking role, either because they are single parents or because their husbands do not share caretaking responsibilities, may be forced to miss work when their children are ill or need to be taken to appointments.

Clearly, the better the child care a woman secures for her children, the more focused, relaxed, and productive a worker she can be. In 1986, 25 million children in the United States under the age of 13 had working mothers: 5.5 million, or 22 percent, were cared for in family day care homes; another 1.5 million children, or 6 percent, were cared for in child-care centers that accomodate large groups of children; 11 million, or 44 percent, were cared for in their own homes, usually by fathers or other relatives; and, perhaps most significantly, another 7 million children, or 28 percent, care for themselves at least part of every day.

What are the economics of child-

care? Family day care homes and day care centers cost between $900 and $3800 yearly per child, depending on the child's age. Generally, preschool care is most expensive, starting at $1500 per year per child. Compare those costs with the 1984 median annual income of female heads of households with children under 18, which was $13,213. Working families generally spend 10 percent of their income on child care, but 10 percent of $13,213 is less than the cost of the least expensive preschool care.

The inadequate number of quality affordable child-care facilities in the United States has a lot to do with the stature and compensation afforded day-care workers, most of whom, not surprisingly, are women. Most earn less than minimum wage and receive no benefits for jobs that are stressful and physically demanding. The turnover rate for child-care providers more than doubles the rate for other occupations.

As women grapple with the economic realities of finding affordable, acceptable child care, business is facing equally sobering realities. Workforce growth is diminishing, and more and more new entrants are women who, in all probability, will bear children during their employment. The need for a loyal, stable workforce has inspired some corporations to "partner" with parents in finding acceptable child-care solutions in advance of federally mandated benefits. (As of August, Congress was considering three bills, two dealing with medical and parental leave and one with child-care services.) In 1985, only 2500 of 6 million U.S. businesses gave support to employee child-care

Carol Lee / Unophoto

The working mother's classic dilemma—who's going to care for a sick child if she doesn't?

needs, but child-care activists like Cynthia Marano, Executive Director of Wider Opportunities for Women, and Judith Lichtman see a growing corporate awareness that helping women find quality child care is ultimately good business.

When it does exist, business support for child care takes many forms. Some large corporations have instituted on- or near-site day-care facilities, either owned entirely by the business or in concert with other local employers, or subcontracted to a qualified child-care entity. Such facilities allow working mothers to nurse, to visit their children at lunch time or on breaks, and to know with confidence that a sitter or family day-care provider's illness will not interfere with their own ability to report to work.

Businesses with too small a workforce to justify such an expenditure can provide other assistance. Some businesses provide working parents with subsidies or vouchers that can be redeemed by qualified centers or caregivers, or arrange for employee discounts with selected child-care programs. Popular with other organizations is the concept of "cafeteria-style" benefit plans where employees select benefit packages that suit their individual needs. According to Carl Behnke, Edison Electric Institute Vice President of Human Resource Management, a number of investor-owned electric utilities offer their employees flexible spending accounts, including the option of child-care payments.

Another approach may be reducing take-home pay to fund child care from pre-tax income. Other support options include sick child care through in-home nursing services or infirmaries; permitting parents to use personal sick days to care for a sick child; and paying to recruit, train, and certify caregivers for children of the corporations' employees.

On the vanguard of benefit experiments designed to lure and keep talented workers, some companies

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Because women usually bear the primary responsibility for caring for the young and the old, workplace policies related to child care and family leave have a greater impact on them than on men.

have approved flexible work schedules for interested employees—usually women returning to work after child-bearing. Such employees work a fixed number of hours but can adjust their work schedules to accomodate personal errands, like dropping their children off at day care or squiring them to the dentist. Other businesses have embraced the concept of the "electronic cottage," allowing some employees to work out of their homes and telecommunicate with the office.

For women who want to work, but who want temporary or permanent part-time hours, some businesses have approved job sharing. Job sharing enables two people to share one full-time job and pro-rated benefits. For example, Kate may work from Monday through noon on Wednesday, followed by Allie, who clocks in at noon on Wednesday for the latter half of the week. The close coordination such a situation requires may well be worth it to new mothers who desire more time with their infants. Because many temporary or part-time workers are women earning minimum wage or less and excluded from benefit packages designed for full-time employees, the pro-rated benefit sharing can make part-time work extremely attractive for working mothers, especially those in two-income families. Carl Behnke cites Northeast Utilities job-sharing program as an illustration of what investor-owned utilities are doing to accomodate workers' growing needs for flexibility.

Parental and Medical Leave

Related to the issue of child care, and of equal importance to many working women, is the concept of job-protected parental or medical leave. Unlike many industrialized nations, the United States has no federally mandated health insurance program. And, unlike more than 100 other countries, the United States has no uniform federal parental leave policy. Yet eighty percent of working women are in their prime childbearing years, and 93 percent will bear a child at some point during their working lives. Not only is the principal caretaking responsibility for these children likely to remain in their hands, but close to 2 million of these same women will care for aging or disabled parents or relatives, whether theirs or their spouses'.

Job-protected family and medical leave is essential in the creation of a "pro-family workplace," according to Judith Lichtman. Moreover, she and other women activists argue that business and government need

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According to workplace activists, job-protected family and medical leave, including disability leave for pregnancies, is "essential in the creation of a 'pro-family' workplace."

to agree on "sex-neutral" public policies that encourage men and women to share care-giving responsibilities, and that, at minimum, don't penalize working women who have children or who single-handedly shoulder the caretaking responsibilities for young or elderly dependents.

Lichtman and her colleagues are careful to define pregnancy as a temporary disability requiring medical leave. Citing medical evidence that normal pregnancies require a minimum of six weeks of disability leave, they do not differentiate between disability leave for pregnancy and disability leave for a sudden illness or temporarily disabling injury, except to note that women can alert employers to the relative timing of their departure from the workplace.

Job-protected disability leave for all workers, regardless of gender, would guarantee workers a job following medical disability, regardless of its cause (maternity, illness, or injury). While the ingredients of such a policy differ depending on who is making the proposal—for example, House and Senate versions of family and medical leave bills currently under consideration differ in the minimum number of workers a company must employ before such mandates would apply—most medical and family leave advocates agree on the need for a standardized written policy. Such standards assure workers of the minimum protections on which they can count.

Some companies offer no job-protected disability leave or a very limited leave without pay, perhaps because they fear that offering women extended paid disability leave will encourage disruptive workplace absences, or perhaps because that is all they can afford, either financially or in terms of day-to-day operational needs.

Other employers, according to the terms of their written policies, continue to pay reduced or full wages during extended disability leave. Likewise with employee benefits: policies vary from no coverage to full coverage for employees during disability leave.

Family leave is another facet of the same issue. Workers with seriously ill children or parents often have no alternative but to care for them themselves during normal workplace hours. Such family responsibilities can decrease produc-

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As the number of women employed in traditionally male occupations has grown, the gap between women's and men's earning power has slowly begun to shrink.

tivity, or worse, threaten job security. Because women traditionally fill the caregiving role, they encounter this dilemma more often than their male coworkers. Many European nations mandate leave in such situations, and U.S. advocates believe that family leave or some form of reduced work policy would benefit workers and employers alike.

Pay Equity

Statistics tell us that, although more new workforce entrants are women than men, women's workplace opportunities are more limited than men's, and they are often separated from advancement or management opportunities by a proverbial "glass ceiling." Statistics also reveal that jobs or professions historically occupied by female workers pay less than those filled by men. In fact, although women make up only 45 percent of the workforce, 60 percent of all minimum wage earners are women. Pink-collar jobs, like clerical work, cleaning positions, and child-care work, for example, traditionally pay less than other occupations.

Equally frustrating to many women who want to work part-time or who can only find part-time work is the status of the jobs for which they qualify or are considered. Part-time jobs generally pay less than full-time jobs, often minimum wage, and usually don't offer benefits like health insurance. The minimum wage, last hiked in 1981, has not kept pace with the cost of living. With three of every five minimum wage earners women, it is no wonder that half of the nine million poor in this country are female, and one and a half million of them head families. For women providing the sole support for themselves and their children, the minimum wage they stretch to cover necessities, including child care, often ends up short of the subsistence mark.

Citing these facts, many advocates of "pay equity" argue that society has tended to undervalue and, therefore, underpay for the work usually provided by women and that it has locked many women into jobs with no mobility or means of advancement.

The issue of pay equity is different than that of equal pay for equal work, which has been federal law since 1963. Instead of simply guaranteeing wage equality for workers in the same position, it invites government and business to contemplate and eliminate sexual and racial discrimination from the wage-setting process—to look with fresh eyes at work historically undervalued and underpaid because it has been performed by women and minorities. Currently, women earn 64 cents to every dollar male workers are paid. Black women earn less, only 56 cents to the dollar, and Hispanic women only 53 cents. The concept of pay equity, looking at jobs in terms of the skills, effort, and responsibility they require, and compensating for them on that basis, could change the way business perceives certain jobs and narrow the gap between the earning power of men and the earning power of women.

Charles Feil / Unphoto

To help women overcome the barriers that have kept them out of the "blue- and white-collar" ranks, many companies, including electric utilities, have mounted aggressive training and affirmative action programs.

has hired economically disadvantaged women who trained for skilled jobs in electromechanics through its "Women Working Technical Program." Efforts such as these underscore the industry's commitment to recruiting and placing women in all echelons of its workforce, and to helping them overcome disadvantages—personal or societal—that historically have

For many, pay equity is directly related to the need for welfare reform in this country. Many full-time female workers remain below the poverty level, unable to make ends meet, much less place their children in adequate day-care facilities while they work. To find better jobs if they are working, or remove themselves from welfare rolls if they are not, some women require temporary financial assistance and access to training and placement programs.

Training

Training and affirmative action programs are equally important to women on both sides of the poverty line. According to Joan Bronk, several electric utility industry programs have enjoyed noteworthy success in recruiting and training women for nontraditional jobs. As a trainer of women in nontraditional jobs, Cynthia Marano agrees. Montana Power Company, for example, has established a "Female Engineer Scholarship" to "attract female engineers to the Company" and to assure "that in the future, there will be qualified females to promote into management positions which have traditionally been filled by employees with an engineering background. A major goal is to encourage more females to enter the field of engineering by providing scholarships for female engineering students." Similarly, Northern States Power Company's "Career Development Program for Women in Power Supply" and its "Career Opportunities" programs allow its female employees and local high school students, respectively, to network and to learn about electric utility industry job prospects. Pacific Gas and Electric Company offers its women in nontraditional positions a "Career Day for Women in Physical Jobs" program, and Public Service Electric and Gas Company

"Displaced homemakers," older women with little or no work-for-pay experience, are especially good candidates for on-the-job training.

kept them from the "blue-" and "white-collar" ranks.

According to Jill Miller, "displaced homemakers" ("women forcibly exiled from their situations by divorce, the death of a spouse, or no longer qualifying for public assistance") are a group whose difficulty in finding suitable employment may be compounded by age discrimination. Often mid-life or older women whose resumes lack official job experience, their situation resembles that of women who can't get credit because they have no credit history. There are more than 11.5 million displaced homemakers in the United States. Says Miller, "They are our mothers, our widowed aunts, our divorced sisters and friends. These are the women who drove the car pools, ran the bake sales, and organized the scout troops and the baseball leagues. And for their sizable contributions to their families, our communities, and our country, they have gotten a raw deal. They are women for whom, suddenly, the rules have changed."

When displaced homemakers do find work, it is generally in non-professional positions, like clerical slots. In the near term, their wages are predictably low; in the long term, those low wages translate into lower retirement income. For employers who ignore traditional cultural biases and recruit and train displaced homemakers, according to Miller, the rewards are demonstrable. These women prove to be highly motivated, loyal, and productive workers, as good at their new job skills as they once were at balancing household budgets and orchestrating PTA meetings.

Nor is the battle always easier for

Bob Daemmrich / Uniphoto

the current generation of well-educated career women. Some of the barriers confronting professional women who compete with men for promotions and management positions are cultural, reflecting society's traditional stereotypical assumptions about women in the workplace. For example, although it is illegal to ask prospective employees whether they have or intend to have children, some supervisors fear that women of child-bearing age will elect to have children and require leave, resign, or suffer productivity decreases as their family concerns vie for their time and energy. At the other end of the spectrum are managers who believe that professional women are "out to prove something" and will cause problems by outperforming their male colleagues or supervisors.

Whatever the reasons, opportunities for employment and advancement are frequently harder won for women than for men. Through explicit or implicit discrimination, American business may be cheating itself out of one of its most valuable resources. If, as Jeffrey Hallett writes in *Worklife Visions,* "Women, more than men, bring to the workplace a higher level of skills in the cooperative, supportive, and nurturing aspects of human interaction, the very skills top executives now declare as necessary to compete," then human resource management programs like those run by Consumers Power and Georgia Power, which assist women in realizing their management potential, might be the wave of the future.

EDISON ELECTRIC INSTITUTE'S HUMAN RESOURCE MANAGEMENT EXECUTIVE ADVISORY COMMITTEE'S WOMEN IN THE WORKPLACE ISSUE STATEMENT

The Human Resource Management Executive Advisory Committee of Edison Electric Institute, comprised of senior human resource professionals from investor-owned electric utilities around the United States, drafts issue statements on workplace topics of importance to the industry over the next three to five years. These statements codify the industry's perspective on critical issues.

• • • • • • • • •

Corporate cultures in our industry need to change if growing numbers of women in the workforce are to be optimally productive and effective and achieve career growth equal to men.

The number of women in the workforce is rapidly increasing and it is expected that ultimately there will be equal numbers of men and women in the workplace. In spite of this dramatic shift in the traditional role of women in our society, many attitudes about women's responsibilities have remained unchanged. In western cultures it has primarily been women who have had the responsibility for taking care of the young, elderly, and less fortunate. As large numbers of them have joined the workforce in order to meet the economic needs of their families, they have not been relieved of the burdens of caring for their children and elderly parents, and in fact are often expected to fully function as both full-time employees and family "caregivers" at the same time. This creates a stressful environment for women who need or want to have a career but also have the responsibility of taking care of their families, often as single parents. Women in jobs that require them to work overtime, travel, or work unusual schedules particularly feel the pressures of fulfilling these dual roles.

Companies need to review their human resource policies and practices and explore ways in which their systems can be designed to address the situations in which women are placed because of conflicting career and family demands. Companies should review their time off policies and should consider including child care and eldercare as part of benefit plans. Flexible working arrangements should be considered, along with assistance in channeling employees to other agencies that can provide assistance. Supervisors should be trained to respond constructively to their employees' work/family conflicts.

The Bottom Line

Ask Irene Natividad, Joan Bronk, Judith Lichtman, Cynthia Marano, Jill Miller, and Joanne Howes which arguments about workplace issues of special interest to women are most persuasive to business and the answer is unanimous: legalities and the high moral road aside, corporations read and heed the bottom line. And addressing women's or family workplace issues is good for the bottom line.

How can policies that increase benefits costs, accomodate prolonged employee absences, and recruit untrained workers be in a company's best financial interests? Simple. As the pool of labor force entrants shrinks, women in general, and older women and women of prime child-bearing years in particular, will play increasingly important roles in the workforce. And, since business has a vested interest in loyal, motivated employees, it must learn how to tap women's full potential productivity if it is to compete successfully. The benefits associated with higher rates of job satisfaction, positive employee morale, and lower levels of absenteeism, tardiness, and turnover can more than offset the costs associated with policies supporting medical and parental leave, affordable child care, and flexible working conditions.

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Turning Customers' Complaints Into a Marketing Asset

Getting to the root of customers' problems pays off in more ways than one.

"Effective complaint handling builds customer loyalty and strengthens market share." This axiom finds expression in an electric utility company when it competes for customers with suppliers of other fuels or with other suppliers of electricity.

There are less obvious benefits of effective complaint handling, however, and they too ultimately can help electric utilities retain or sharpen their competitive edge, even with customers who cannot readily switch suppliers. In addition to increasing customer satisfaction and loyalty, well-designed procedures and policies for responding to customers' complaints can 1) reduce the number of complaints registered with regulatory agencies, 2) reduce customer service expenses, and 3) increase sales of supplemental services and products.

The Causes

To identify areas that need improvement, utility management must first identify the root causes underlying customers' problems. Many companies already capture data on the general nature of customer contacts—high bill, missed appointment, payment arrangements, etc.—but those descriptions do not explain what gave rise to the problem and caused the customer to vocalize it.

As Table 1 indicates, the *true* causes of customers' problems can be employee based, company based, or customer based. Our research shows that failures of individual employees generally represent 20 percent or fewer of all escalated complaints, that is, complaints not handled by the front line and subsequently registered with a higher level employee or with a state regulatory agency. In fact, most customers' problems are caused by their own mistaken expectations or failure to follow procedures, or by specific company policies and the inflexibility of them.

The implications for utility management are clear. First, customers must be educated about company policies and procedures and the rationale behind them. When customers know what to expect, they encounter fewer unpleasant surprises and company employees encounter fewer "dumb" questions. For example, one New York electric utility found that a simpler, clearer bill reduced unnecessary inquiries about the bill by approximately 42 percent.

Second, customers need a visible appeals mechanism within the company so those unhappy with basic service procedures can easily complain before escalating the complaint further. Such an internal appeals unit saves executives time and usually decreases complaints made to regulators by 20 to 30 percent almost immediately.

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The Role of Customer-Contact Units

When a customer service department's single objective is to respond to individual customer complaints and inquiries, it is doomed to remain in a perpetual "fire-fighting" mode, handling problems and questions as they are received. If, however, one of the department's major roles is to continuously ask "What part of our workload could be prevented and how can we accomplish that?", the number and cost of unnecessary customer contacts can be reduced. Of course, to achieve this change in attitude among customer-contact personnel, top management must visibly support the goals of reducing service cost via reducing unnecessary contacts and increasing customer satisfaction. The company must employ a system to capture contact data that distinguishes between general contact categories and the root causes of those contacts.

The Goal of Customer Satisfaction Surveys

In the 1970s, most companies assumed that if they did not receive large numbers of complaints, they were providing reasonably good service. In the 1980s, many companies have commissioned annual "do you love us" surveys which measure the satisfaction of their en-

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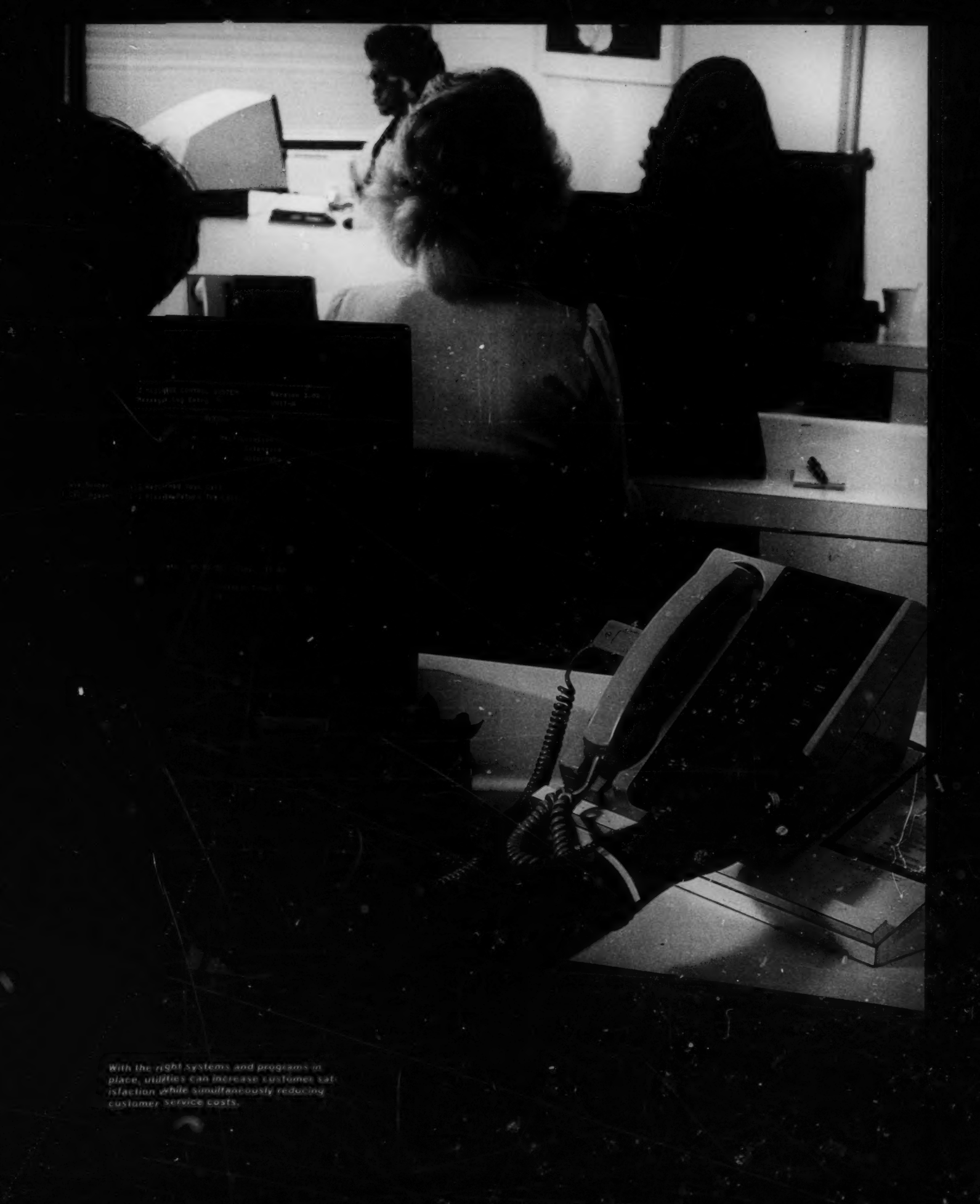

With the right systems and programs in place, utilities can increase customer satisfaction while simultaneously reducing customer service costs.

Table 1

Root Causes of Complaints

Employee Based
Failure of individual employee to follow policy or procedure due to lack of motivation and/or skills
Company Based
System failure or failure of units to coordinate
Service system specifications which result in nonfulfillment of reasonable expectations
Company policy correctly implemented alienated the customer but employee does not have authority to modify policy
Customer Based
Incorrect customer expectations
Failure of customer to follow company procedures due to a lack of information/ education
Attempt by customer to avoid payment or stop completely valid credit/shut off actions
Customer error

tire customer base at a point in time. Generally, 90 percent or more of the respondents will indicate they are satisfied with the service the utility is providing.

There are two major reasons why such surveys tend to delude management about levels of customer satisfaction. First, if the total customer base is surveyed, at least 80 percent will have had no transaction with the utility (other than paying bills). These respondents tend to give higher ratings. In contrast, ratings from respondents with recent transactions tend to reflect low expectations or unresolved problems. Second, many of those who do give a utility a high rating will also state that it gives mediocre service compared to other service providers. Consequently, utility managers should not let good overall ratings let them relax.

The following example will illustrate. A northeastern gas utility asked customers to rate service on a 1–10 scale, with "7" being "good" and "9" being "excellent." Overall, the company received a rating of 8.4. However, when responses were segmented depending on whether or not the customer had a recent transaction, the utility found that those who had a recent transaction gave ratings 2–3 points below those who had not. Basically, customers liked the utility until they had to deal with it for anything other than routine service.

An Ounce of Prevention

By establishing a formal ongoing prevention analysis function, utility management can identify the causes of customers' contacts and take steps to correct them. In fact, several electric, gas, and telephone

Failures of individual employees generally represent fewer than 20 percent of all escalated complaints. . . . In fact, most customers' problems are caused by their own mistaken expectations or failure to follow procedures, or by specific company policies and the inflexibility of them.

John Zoiner / Unphoto

By asking the right questions, a service representative can identify the true source of a customer's problem, the first step in preventing its re-occurrence.

utilities have already established units to focus on problem prevention and analysis, and they report noteworthy success.

One northeastern electric utility, for example, has implemented a detailed classification system that includes code categories for the root cause of a problem, the problem's location, the reason the complaint was escalated beyond the front line (which indicates why the routine service system failed to satisfy the customer), and the department responsible. All escalated complaints are coded within this system, and a staff person analyzes the resulting statistics and requests changes in policies, procedures, customer education activities, etc., to alleviate recurring problems.

The system is also used to analyze routine, or non-escalated, customer contacts. Random samples of such contacts are coded, and senior management in the area responsible reviews the results and modifies procedures found to be causing problems.

Through this problem prevention and analysis system, the company found, for example, that customers' inability to contact the service unit during normal business hours was a major cause of dissatisfaction and escalated complaints. In response, the company opened telephone lines for routine customer calls 24 hours per day, 365 days per year. The utility now handles about 2,000 calls each weekend and has achieved an answered call rate of over 97 percent. Fewer customers now complain that they "can't get through," and complaints escalated to the regulatory level have dropped significantly.

To supplement the system, the

Barbi Cherney / Unphoto

company's vice president of customer relations meets monthly with a group of front-line representatives. The meetings cover all areas that affect customer satisfaction, and representatives share their thoughts about problems and suggestions for improvements. Specific problems or suggestions are then investigated and any actions taken are reported to the group.

Similarly, a gas utility has empowered its consumer analysis department to identify the root causes of customers' problems and to develop recommendations to address them. The department prepares monthly customer-contact reports tailored to various recipients' needs. For example, sales reports establish the volume of complaints vs. the volume of sales for each salesperson. Department reports are used to identify special training needs or desirable remedial actions. Reports on escalated complaints are prepared quarterly, and reports on corrective actions and their impacts are prepared semi-annually.

The same company also has established interdepartmental groups to perform in-depth analyses of major escalated complaint categories. These groups recommend corrective actions to prevent recurring problems. For instance, after analyzing complaints related to estimated bills, the company found it could justify installing remote meters (at no charge to the customers) in areas with a large number of estimated bills and/or a high concentration of single family homes. Elsewhere, meter readers leave a customer dial card if they are unable to get to the meter so the customer can mail or phone in the actual reading.

A telephone company's problem prevention and analysis system has

An internal appeals mechanism can help a utility resolve dissatisfied customers' problems and keep complaints from escalating to the regulatory arena.

not only reduced the cost of customer service but also increased sales. First the company identified lack of customer education as a root cause of complaints about repair requests for customer-owned equipment. After initiating a preemptive education campaign to warn customers of their responsibility for repairing their own equipment, the company began marketing a new service to insure them against it.

Transaction-related customer surveys can also help improve customer satisfaction. For example, one west coast electric utility sends a postcard questionnaire to a random sample of customers who have had any transaction with the company in the previous month. Reports then rank divisions within the company and specific groups (busi-

ness office, telephone center, energy conservation, service planning, etc.) by the level of customer satisfaction they achieved. Any specific customer comments/complaints are followed up.

At one east coast electric utility, every department manager makes at least 10 follow-up calls weekly to customers who have had service. This procedure identified delayed response to routine service requests as the main cause of customers' dissatisfaction with the electric service department. In response to that finding, the company modified the electronic bulletin board on representatives' computer screens to display estimated time ranges for various categories of service work.

One other valuable component of a program to reduce escalated complaints is a well-publicized internal appeals mechanism. As with customer surveys, employees will "do it right the first time" more often if they know that customers have an easily accessible route of appeal. Such units can be very small and inexpensive. In some utilities they also perform the prevention analysis function. And, to ensure that such units are used solely as an appeal mechanism, most companies require customers reporting to them to have the name of a front-line employee with whom they have already spoken. Several utilities have established appeals units. One company features its unit on signs in the business office, in newsletters, and on the back of bills. Since its creation, the company has seen a drop in the number of escalated complaints.

The Pay-Off

Working in concert, prevention analysis, transaction-based surveys and an internal appeals mechanism can help utilities keep their customers satisfied while simultaneously reducing customer service workload and cost. Clearly the investment pays off—for customers, employees, and shareholders alike. Or, as most marketing professionals agree, "there's no asset more valuable than satisfied customers."

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FINANCIAL REVIEW

FORECASTED CONSTRUCTION EXPENDITURES CONTINUE TO DECLINE

Investor-owned electric utilities project spending $71.8 billion for electric utility plant during 1988–90 according to Edison Electric Institute's seventh annual survey of construction expenditures. As shown in Table 1, the $2.5 billion drop from 1987's three-year forecast continues the downward trend that has characterized the survey results since it was begun in 1982.

Table 2 shows the breakdown of expenditures by year and by type of plant. The data were tabulated from an industry-wide survey conducted from March through early May of 1988. The 123 companies responding represent 98 percent of the assets of the investor-owned electric utility industry. The companies applied, on average, a 4.5 percent annual rate of construction escalation, up from 4.3 percent reported last year.

Table 1
Projected Construction Cost

Year of Survey	Forecast Period	Total Electric Plant Construction (Millions of Dollars)
1982	1982–84	$ 103,490
1983	1983–85	$ 102,180
1984	1984–86	$ 90,562
1985	1985–87	$ 87,991
1986	1986–88	$ 81,891
1987	1987–89	$ 74,365
1988	1988–90	$ 71,813

Nuclear Generation

The preliminary 1987 data show that nuclear construction expenditures have declined for the fourth consecutive year from a high of $18.2 billion in 1983 to $9.2 billion in 1987. The estimates for future years project a continuation of this declining trend. Should the $2.6 billion estimated for nuclear construction expenditures for 1990 actually occur, it will be the lowest amount since 1971, when $2.4 billion was recorded.

As of May 20, 1988, when the survey was completed, there were ninety-six investor-owned nuclear plants in commercial operation. Of the ten nuclear plants awaiting completion, two plants had low power licenses, three had full power licenses, and five plants remained under construction. No new nuclear units are planned.

Coal Generation

The preliminary coal plant construction expenditures for 1987 are $3.4 billion, a slight decrease from the $3.7 billion forecast in last year's survey. During 1987, six coal units went into service. Three coal units are projected to go into service in 1988 and three in 1989. The number of coal facilities being constructed is decreasing, but the amount of construction costs for coal generation is projected to increase, due partly to the repowering of existing plants. Future construction costs related to coal generation projects are estimated to average $4.0 billion a year for the 1988–1990 period.

Transmission and Distribution

The upward trend of expenditures for transmission and distribution facilities is highlighted in Table 3. In fact, the 1988–90 forecast is the first to show construction expenditures for transmission and distribution facilities exceeding those for electric generating plant. The preliminary results show transmission construction costs for 1987 to be $2.0 billion, $372 million lower than forecast in the 1987 survey. The amount estimated to be spent on transmission facilities for 1988 is $2.5 billion, a 24.2 percent increase over the 1987 figure. During the three-year forecast period, transmission construction expenditures are estimated to average $2.5 billion a year. The construction of high voltage transmission lines is expected to make up the bulk of the projected transmission expenditures.

AFUDC

The preliminary estimate for allowance for funds used during construction (AFUDC) for 1987 electric plant construction expenditures is $4.4 billion, a 22.5 percent decrease compared to the $5.7 million recorded in 1986. This is the third consecutive year that AFUDC declined since peaking at $7.9 billion in 1984. The survey results indicate that the trend will continue over the three-year forecast period, during which AFUDC is estimated to average $2.2 billion a year. In 1986 AFUDC was 18.2 percent of total electric utility construction. By 1990 this figure is estimated to drop to 9.5 percent. The decline is partly attributed to more companies being involved in shorter term projects on which relatively less AFUDC is booked. The trend of declining AFUDC means that the quality of earnings and cash flow for the industry will continue to improve.

Cash Flow

Decreasing plant expenditures coupled with decreasing AFUDC ac-

Table 2
1988 Survey of Investor-Owned Electric Utility Industry Estimated Construction Expenditures
(Millions of Dollars)

	Actual		Forecast			Summary of 1988–1990
	1986u	1987p	1988	1989	1990	
Electric Generating Plant						
Nuclear	$13,426	$ 9,183	$ 5,347	$ 3,984	$ 2,597	$11,927
Coal	4,333	3,433	3,948	4,081	4,082	12,111
All Other	724	1,615	1,682	1,692	1,696	5,070
Total Electric Generating Plant	$18,483	$14,230	$10,976	$ 9,757	$ 8,375	$29,109
Transmission and Distribution Facilities						
Transmission Facilities	$ 1,761	$ 1,991	$ 2,473	$ 2,652	$ 2,339	$ 7,464
Distribution Facilities	7,248	7,238	7,411	7,384	7,434	22,229
Total Transmission and Distribution Facilities	$ 9,009	$ 9,229	$ 9,884	$10,035	$ 9,773	$29,693
General and Miscellaneous Plant	$ 1,808	$ 2,032	$ 2,493	$ 2,240	$ 2,251	$ 6,983
Nuclear Fuel Expenditures	$ 1,724	$ 1,650	$ 1,899	$ 1,909	$ 2,220	$ 6,028
Total Electric Utility Plant	$31,024	$27,141	$25,253	$23,941	$22,618	$71,813
Amount of AFUDC in Total Electric Plant	$ 5,659	$ 4,387	$ 2,384	$ 2,187	$ 2,158	$ 6,730

p - Preliminary Data
u - EEI *Statistical Yearbook/1986*

Table 3
Percentage Shares of Construction

Year of Survey	Forecast Period	Electric Generating Plant	Transmission And Distribution Facilities
1983	1983–85	70.0%	22.2%
1984	1984–86	64.4%	29.8%
1985	1985–87	54.0%	32.7%
1986	1986–88	48.8%	36.0%
1987	1987–89	43.5%	40.2%
1988	1988–90	40.5%	41.3%

cruals will contribute to an improving industry internal generation of cash for construction expenditures. An increasing amount of cash flow from operations is also expected. The companies which participated in the survey indicated an average of 86.0 percent of their construction requirements over the 1988–90 period will be financed internally. Cash flow growth for the industry will be enhanced by higher amounts of cash from earnings and depreciation but will be tempered by the impacts of the Tax Reform Act of 1986 and lower allowed returns on equity.

First Quarter Results

Increased electricity sales and timing adjustments for changes in the method of accruing unbilled revenues boosted first quarter electric operating revenues to $32.5 billion, a 6.1 percent increase over the first quarter of 1987. The increase was associated with a 5.9 percent increase in electric operating expenses. Earnings per share for the quarter, after extraordinary items, increased 4.5 percent. (See Table 4.)

The industry's balance sheet improved as construction work in progress fell almost 40 percent during the twelve-month period. As a percentage of net plant in service, it dropped from 25.9 to 14.0 percent. (See Table 5.)

Tables 4 and 5 are based on unaudited reports from a sample of investor-owned electric utilities that represents about 93 percent of the industry's total assets. With Standard & Poor's Utility Compustat II database, the data were adjusted to represent the entire industry. EP

Contributed by Edison Electric Institute's Finance Department.

Table 4
Investor-Owned Electric Utility Industry Statement of Income
(Millions of Dollars)

	Three Months Ending March 31,			Twelve Months Ending March 31,		
	1988	1987r	% Change[3]	1988	1987r	% Change[3]
Total Electric Operating Revenues[1]	$32,543	$30,675	6.1	$131,863	$127,468	3.4
Electric Operating Expenses						
Fuel	$ 7,829	$ 7,582	3.3	$ 31,873	$ 31,499	1.2
Other Operation & Maintenance	10,053	8,754	14.8	39,630	36,435	8.8
Depreciation & Amortization	3,521	3,081	14.3	13,250	11,932	11.0
Costs Deferred under Rate Phase-in Plans	(325)	(255)	27.3	(1,074)	(902)	19.1
Taxes Other Than Income Taxes	2,625	2,463	6.6	10,184	9,610	6.0
Income Taxes: Federal & Other	1,426	1,563	(8.8)	6,532	6,537	(0.1)
Deferred Income Taxes	624	937	(33.4)	3,433	5,299	(35.2)
Investment Tax Credits, Net	(45)	150	N.M.	270	782	(65.5)
Total Electric Operating Expenses	$25,708	$24,275	5.9	$104,097	$101,192	2.9
Electric Operating Income	$ 6,835	$ 6,400	6.8	$ 27,767	$ 26,276	5.7
Other Utility Operating Income	708	625	13.4	1,128	1,252	(9.9)
Total Utility Operating Income	$ 7,543	$ 7,025	7.4	$ 28,895	$ 27,528	5.0
Other Income & Deductions—Net	$ 367	$ (92)	N.M.	$ 556	$ 902	(38.4)
Phase-in Deferrals	214	187	14.6	917	598	53.2
Allowance for Other Funds Used During Construction	421	902	(53.3)	2,568	3,974	(35.4)
Total Income Before Interest Charges	$ 8,546	$ 8,022	6.5	$ 32,936	$ 33,003	(0.2)
Interest Charges						
Interest on Long-Term Debt	$ 3,684	$ 3,681	0.1	$ 14,577	$ 14,877	(2.0)
Other Interest Expenses & Charges	231	224	3.1	947	939	0.8
Allowance for Borrowed Funds Used During Construction	(379)	(526)	(28.1)	(1,734)	(2,252)	(23.0)
Net Interest Expenses & Charges	$ 3,537	$ 3,379	4.7	$ 13,790	$ 13,564	1.7
Net Income Before Extraordinary Items	$ 5,009	$ 4,643	7.9	$ 19,146	$ 19,439	(1.5)
Extraordinary Items	0	(99)	N.M.	52	(396)	N.M.
Cumulative Effect of a change in accounting principle[4]	(1,455)	(1,077)	35.0	(1,455)	(1,077)	35.0
Net Income	$ 3,555	$ 3,467	2.5	$ 17,744	$ 17,966	(1.2)
Preferred Dividends Declared	563	665	(15.4)	2,351	2,685	(12.4)
Net Income Available for Common	$ 2,992	$ 2,802	6.8	$ 15,393	$ 15,281	0.7
Common Dividends Declared	3,289	3,220	2.1	12,742	12,371	3.0
Additions to Retained Earnings	$ (297)	$ (419)	29.0	$ 2,651	$ 2,910	(8.9)
Average Shares Outstanding[2]	6,461	6,357	1.6	6,446	6,319	2.0
Earnings Per Share Before Extraordinary Items and the Cumulative Effect of a change in accounting principle[2]	$ 0.69	$ 0.63	9.5	$ 2.61	$ 2.59	0.8
Earnings Per Share After Extraordinary Items and the Cumulative Effect of a change in accounting principle[2]	$ 0.46	$ 0.44	4.5	$ 2.39	$ 2.42	(1.2)
Common Dividends Per Share[2]	$ 0.51	$ 0.51	0.0	$ 1.98	$ 1.96	1.0

[1]Revenues are adjusted for intra-industry sales for resale of electricity.
[2]Based on average shares outstanding as reported to EEI by survey respondents and adjusted for stock splits.
[3]Percent changes may reflect roundings.
[4]Total reflect 1988 and 1987 first quarter data only.
r—Revised to reflect company restatements.
N.M.—Not Meaningful.

Table 5
Investor-Owned Electric Utility Industry Balance Sheet
(Millions of Dollars)

Assets	March 31, 1988	March 31, 1987r	Percent Change[3]
Utility Plant[1]			
Utility Plant (Including Nuclear Fuel)	$441,904	$395,766	11.7
Less Accumulated Depreciation	122,478	110,614	10.7
Total	$319,427	$285,153	12.0
Construction Work in Progress	44,663	73,882	(39.5)
Net Utility Plant	$364,090	$359,034	1.4
Investments	16,577	14,491	14.4
Current Assets	40,836	40,430	1.0
Deferred Debits	28,029	22,627	23.9
Total Assets	$449,530	$436,582	3.0
Capitalization & Liabilities			
Capitalization			
Common Stock	$ 91,236	$ 89,523	1.9
Retained Earnings	50,721	48,710	4.1
Preferred Stock	26,910	28,737	(6.4)
Long-Term Debt	160,343	157,723	1.7
Total Capitalization	$329,211	$324,693	1.4
Current Liabilities			
Short-Term Debt	$ 8,042	$ 6,396	25.7
Long-Term Debt Due Currently	5,538	5,747	(3.6)
Other Current Liabilities	30,928	30,637	0.9
Total Current Liabilities	$ 44,507	$ 42,779	4.0
Deferred Credits			
Capital Lease Obligations, Non-Current Portion	$ 4,607	$ 4,722	(2.5)
Accumulated Deferred Income Taxes[2]	42,824	38,567	11.0
Accumulated Deferred Investment Tax Credits	17,006	16,702	1.8
Other Deferred Credits	11,376	9,119	24.8
Total Deferred Credits	$ 75,812	$ 69,110	9.7
Total Capitalization & Liabilities	$449,530	$436,582	3.0

[1]Includes non-electric utility plant.
[2]Includes property-related deferred income taxes.
[3]Percent changes may reflect roundings.
r—EEI changed its reporting methodology so that property-related deferred income taxes are now entered as a liability rather than a reduction to plant. Data for 1987 also have been revised due to company restatements.

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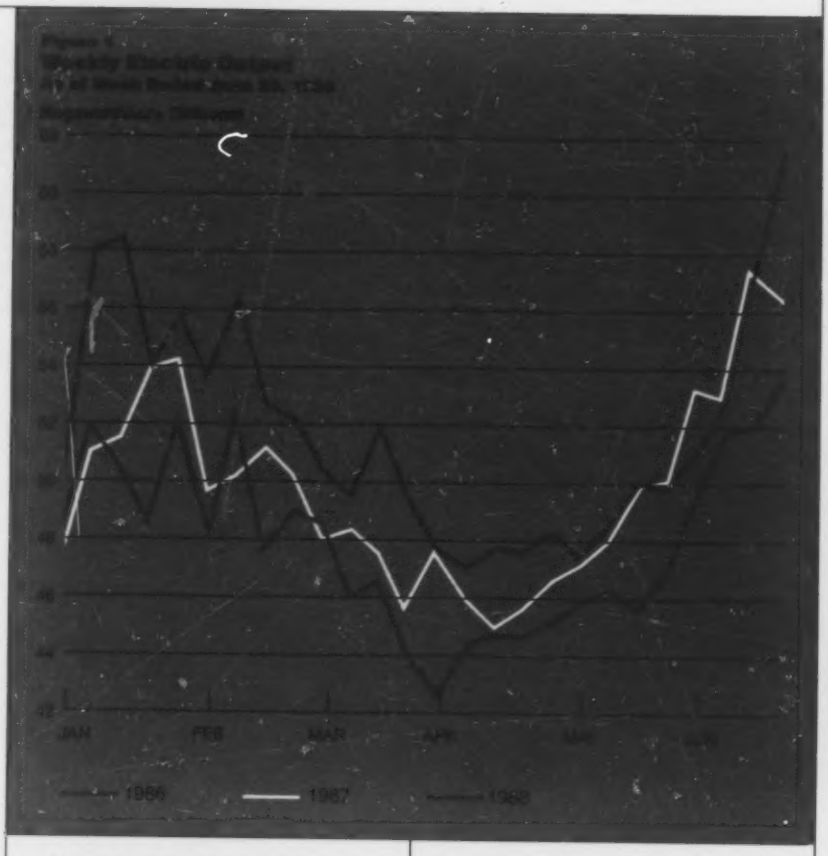
STATISTICAL REVIEW

ELECTRIC OUTPUT UP FOR FIRST HALF OF YEAR

For the first six months of 1988, the total electric utility industry's electric output increased 4.3 percent over the same period of last year. Much of the increase can be attributed to the severe winter, the early summer heat wave, and the current steady economic growth. With increases of 8.6 and 7.5 percent respectively, the Pacific Northwest and West Central divisions led the industry with the largest increases for the first six months.

The 1988 year-to-date electric output of the United States has continued to increase over that of 1987 and 1986 (see Figure 1). Toward the end of the second quarter of 1988 the industry experienced a new weekly record of 61,424 gigawatthours (GWh) of electric output for the week ended June 25, 1988. This represented a 9.0 percent increase over the same week one year ago, and a 1.2 percent increase over the previous record high of 60,700 GWh set on August 8, 1987. Of the area divisions, West Central, Rocky Mountain, and New England experienced increases of 18.1, 12.9, and 12.1 percent, respectively. While weekly records are normally recorded in the hot months of July and August, it is unusual to have a record set so early in the summer. At the time of this writing, the June 25 record has already been broken by the output recorded for the week ending July 16. That record—62,889 GWh—may very well be broken again before summer ends.



Due to the colder than normal temperatures during the first quarter of 1988, the United States was faced with a greater demand for electricity. Heating degree days for January and February were much higher than those of 1987, causing a substantial increase in the deviation from the normal degree days. By the second quarter, the industry was in the midst of an early summer heat wave which caused a rise in the cooling degree days of approximately 8.6 percent above the normal degree days.

In addition, electricity sales increased significantly during the early months of 1988. For the first quarter of this year, total electricity sales for the United States increased 6.8 percent over the same period of last year. Commercial sales experienced the largest growth with an increase of 7.8 percent. Sales to residential and industrial customers also increased significantly by 6.8 and 6.1 percent, respectively. The industry has not seen an increase such as this one since the second quarter of 1984 when electricity sales to ultimate customers increased 8.9 percent over the second quarter of 1983. Preliminary estimates indicate that sales are expected to show a 3.0 percent increase for the year 1988.

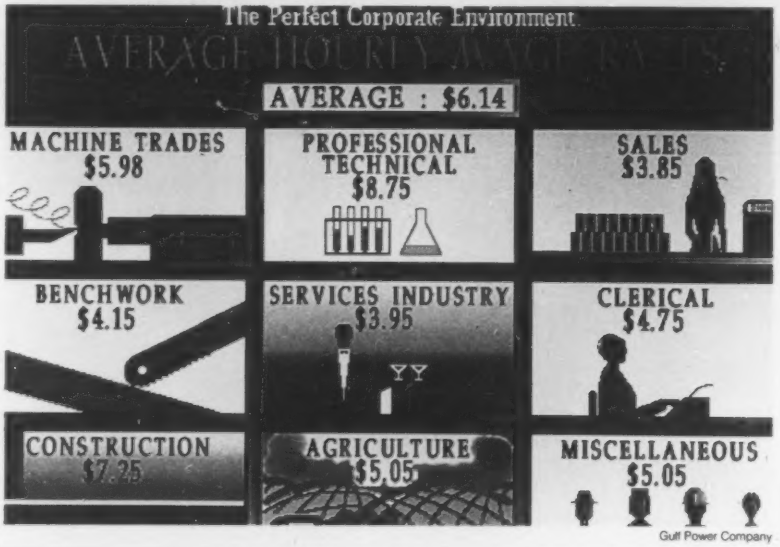
Contributed by Edison Electric Institute's Statistics Department.

TECHNOLOGY REVIEW

LASER DISC TECHNOLOGY SUPPORTS ECONOMIC DEVELOPMENT STRATEGIES

State-of-the-art laser disc technology is playing a major role in the economic development strategies of Georgia Power, Gulf Power, and Alabama Power. Interactive video presentation systems allow corporate site planners visiting the corporate headquarters of Georgia Power in Atlanta, Gulf Power in Pensacola, and Alabama Power in Birmingham to zero in quickly on specific information regarding locations of industrial parks, the labor market, retail expansion, access to utilities, area demographics, names of existing industries, transportation, and climate—all with the simple touch of a finger. A process that used to take days now takes hours.

Georgia Power Company was the first of these southern utility companies to identify the potential for this innovative technology in an economic development capacity. In the Energy Planning Center at Georgia Power, where one of their two laser disc systems is housed, Georgia Power uses their video presentation capabilities to showcase information on their consumer products and services; at the Georgia Business Location Center (GBLC), where a duplicate system is housed, they use laser disc technology and interactive video for the purpose of economic development. The technology's potential for economic development is already being realized. "Of the more than 180 companies that visited the GBLC since its inception in early 1987, 32 have located in Georgia with a capital investment exceeding $1 billion," according to GBLC facilities locations manager Lynn Pitts. "We're now in the process of integrating these two laser disc systems into one very powerful marketing tool for Georgia Power," he added.



Similar to Georgia Power's Energy Planning Center and Georgia Business Location Center is Gulf Power's Business Development Center, which opened recently for the purpose of promoting economic development for the communities in their 9-county service area in northwest Florida. There, information on 12 communities is visualized on a standard interactive video system called eMEDIA. In a series of three 3-minute videos accessed by using a touch-sensitive screen, site planners can complete an "armchair tour" of these areas quickly and comprehensively. "Laser disc technology enables us to present economic information in an entertaining fashion which, we've found, helps hold the viewer's attention," said senior economic development representative Paul Saia. Their investment in this technology and economic development approach is proving to be a financially sound one as well. In the past three years, Gulf Power has spent a tremendous amount of money on national advertising, promotional items, and salaries for economic development purposes. The Business Development Center has cost them a fraction of that with most of it going for equipment and materials.

Alabama Power opened the Alabama Resource Center in May, putting the company "in a strong position in the competition for new industry," according to Charlton McArthur, Vice President, Economic Development for the company.

The center has interactive video capabilities which provide a host of data on virtually every industrial site in the state, complete topographic and demographic data on the entire state, plus video presentations on the business climate and quality

of life in some 45 communities in the state.

"Our goal is to attract new industry and commercial development in the state by putting Alabama under one roof," said Joe Ellis, Director of the Resource Center.

Laser disc presentations are available to all of the state's Chambers of Commerce, local communities and the state's industrial development office. The center boasts aerial photos capable of showing 33 million acres of Alabama to a prospect in one sitting.

Prospects can tell the staff at the center what they are looking for and the data base will automatically search through hundreds of locations to find the ones that meet the criteria. A touch of the computer screen allows the client to instantly see data about the site. A catalogue of 52,000 U.S. Geological Survey maps allows a prospect to touch the screen and zoom in on a particular area for a detailed look at topography, transportation routes, and energy transmission lines.

Once sites which really interest the prospect are identified, the center can arrange for a helicopter to take the prospect there for a first hand look at each location, usually in one day.

Finally, the center helps the prospect present his findings to his own company by providing videotape and hard copies of all the pertinent material reviewed.

Contributed by Still Current Design, Inc., Atlanta.

REGULATORY REVIEW

PROPOSED RULES RESTRICT UTILITIES' FLEXIBILITY

The Notices of Proposed Rulemaking on Competitive Bidding and Independent Power Producers advanced by the Federal Energy Regulatory Commission impose unnecessary restrictions on a utility's ability to select future power supply options, the Edison Electric Institute, representing the investor-owned electric utility industry, told FERC in July.

In comments on the proposed rules, the utility industry stressed that any proposals for regulatory change must expand, not erode, the resources and options from which utilities may choose to fulfill their service obligations. The industry is concerned that the proposed rules would actually reduce a utility's flexibility and supply options, despite FERC's claims to the contrary.

In some respects, issuance of these proposed rulemakings was a response to problems resulting from state implementation of the Public Utility Regulatory Policies Act of 1978. That Act, which requires utilities to purchase power produced by cogenerators, led to certain abuses and consumer inequities, such as requiring utilities to purchase cogenerated electricity at a price that at times exceeded the utility's cost of supplying power itself. A plea to FERC for reform was followed by issuance of three Notices of Proposed Rulemaking (NOPR). (For an overview of the NOPRs, see pp. 8–18, *Electric Perspectives*, Summer 1988.) Comments on the first rulemaking, dealing with the price utilities pay for cogenerated power, were filed on June 16. The remaining two proposals go beyond changes in PURPA oversight to include provisions for a competitive bidding process for the selection of new utility generation sources. In addition, the FERC proposals would create a new class of power suppliers: non-regulated suppliers (called independent power producers or IPPs) which, along with cogenerators, would be allowed to participate in the bidding process.

A primary concern expressed by the industry is that the two proposals create a regulatory bias against electric utility participation in future electricity supply markets. For example, the IPP NOPR would prohibit a utility-owned facility from obtaining the same degree of pricing flexibility granted to other participants by FERC. In addition, the Competitive Bidding NOPR contains provisions which could preclude utilities from fully participating in a competitive bidding process. The result, based on the proposals as currently drafted, is contrary to FERC's assurance that utilities have been given enough flexibility to allow them to select reliable supply options at the lowest reasonable cost. Moreover, "FERC lacks the authority to modify the Public Utility Holding Company Act as is [also] necessary to allow all participants to compete on equal terms," EEI stated.

And, although not part of the proposed rules themselves, FERC has also sought comments on the need to condition utility participation in competitive bidding on mandatory access to transmission. "The separate suggestions for conditioning competitive bidding on mandatory [transmission] wheeling requirements are unnecessary and beyond FERC's authority to

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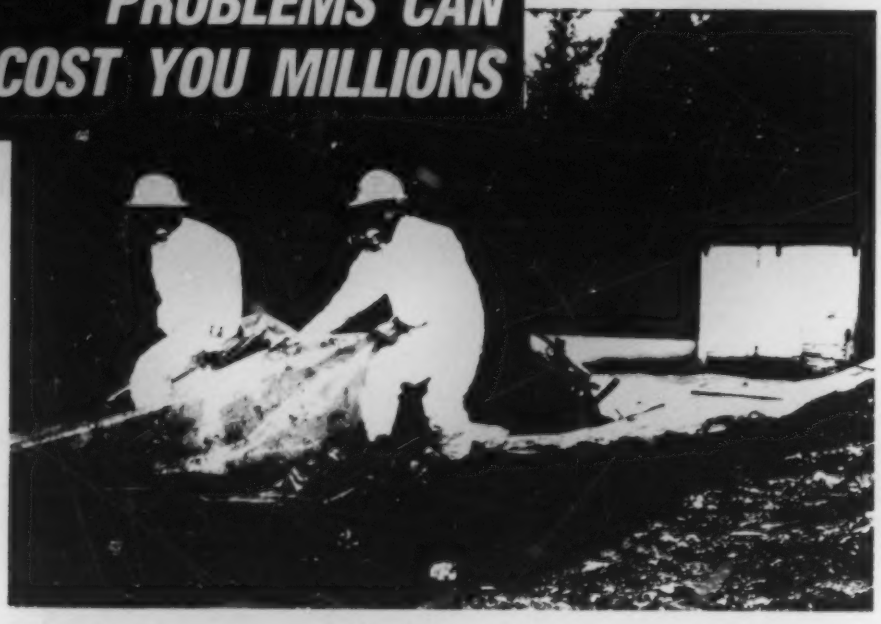

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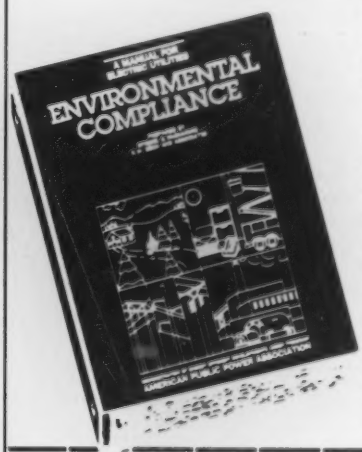

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implement," EEI said. The industry's comments go on to say that such a condition should not be imposed without a thorough review of 1) transmission pricing issues; 2) the ability to construct new transmission facilities; and 3) possible customer by-pass issues. Such a proposal would introduce inefficiencies into wholesale power markets. That, EEI says, would be counterproductive to FERC's own stated goals.

"EEI believes that, except where modifications to federal statutes are required, the FERC can accomplish the objectives of competitive selection processes by issuing a Policy Statement instead of new rules, identifying the minimum requirements for bidding to be lawful under PURPA and the Federal Power Act, and encouraging utilities, in cooperation with the states, to voluntarily experiment with competitive bidding to obtain new power supplies."

In addition, EEI offered an alternative to the proposed IPP definition in order to allow the same flexible ratemaking rules to be applied to all participants—IPPs and utilities alike—in cases where the purchaser has a free choice in selecting power suppliers to meet its customer needs. "This alternative [definition] assumes that the Commission merely wants to 'expand utility supply options' as promised in the NOPR," the industry stated. "If that is all the Commission wants to do, this proposal [offered by EEI] appears to be a more equitable way to achieve that goal. If the Commission rejects this alternative, and continues with the definition in the NOPR, that would indicate that the Commission will actually create a preferred class of suppliers."

Other concerns about the proposals include:

- Significant reliability issues are not addressed, particularly with respect to purchases from a large number of non-utility producers and the necessity to integrate them into a complex electric utility system.
- The Commission must consider the effects of the IPP proposal on utility system planning and operation to ensure that reliable service to customers is maintained.
- Transmission issues should be addressed separately, if at all, and must include appropriate transmission pricing policies before access issues are considered. In addition, there is no legal authority for FERC to condition a bidding system on the provision that electric utilities must provide transmission services to the losing or even winning bidders.
- The proposals could be interpreted to allow IPP sales directly to utility wholesale customers, creating a whole new set of economic and consumer equity issues not discussed in the NOPRs.
- Sources which gain competitive advantages from U.S. government tax or preference subsidies should be excluded from bidding.
- Demand-side options should be a consideration in utility resource planning, but should not be involved in the bidding process.
- The amount of capacity subject to bidding should be the utility's decision, subject to state regulatory oversight.

In closing, EEI urged the Commission to consider these comments carefully and focus on the effects of the rules upon electric consumers. EEI also stated that FERC must demonstrate that the proposed changes are needed to insure adequate, reliable and efficient power supplies at the lowest reasonable cost to consumers.

Contributed by Edison Electric Institute's Public Information Department.

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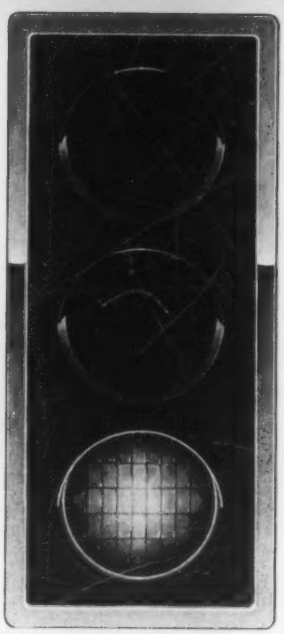

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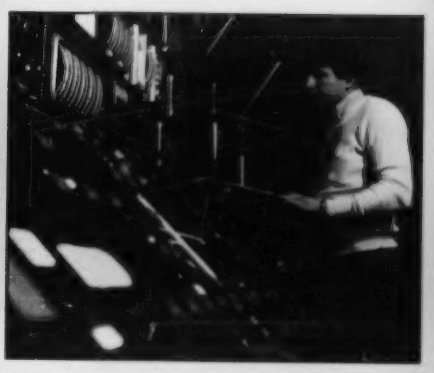

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